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Asthma Chronic Obstructive Pulmonary Disease Overlap Syndrome

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Introduction

Throughout recent years, asthma and chronic obstructive pulmonary disease (COPD) have been viewed as two separate diseases, with two separate pathophysiologies, and two different treatment plans, essentially ignoring the possibility of a dual diagnosis. (Barrecheguren, Esquinas, & Miravitles, 2015). In 2014 the Global Initiative for Chronic Lung Disease (GOLD) and Global Initiative for Asthma (GINA) acknowledged that patients could indeed have both pathophysiologies of COPD and asthma (GOLD & GINA, 2015). The GOLD and GINA collaboration led to a consensus description of what is referred to as the asthma-COPD overlap syndrome (ACOS) (GOLD & GINA, 2015).

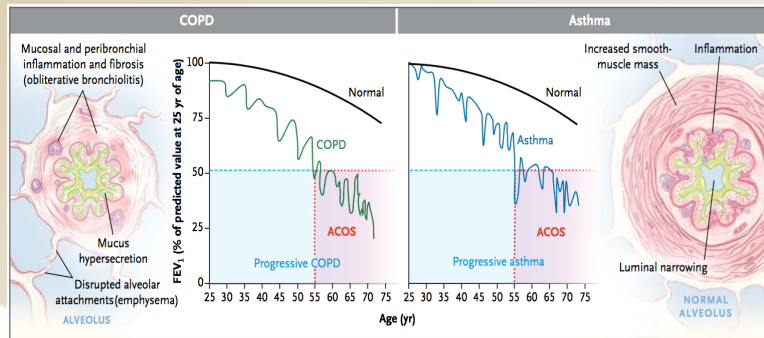
Asthma is defined as a heterogeneous disease, usually characterized by chronic airway inflammation (GOLD & GINA, 2015). It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation (GINA, 2017). COPD is defined as a common preventable and treatable disease, characterized by persistent airflow limitation that is usually progressive and associated with enhanced chronic inflammatory responses in the airways and the lungs to noxious particles or gases (GOLD, 2017). ACOS is characterized by persistent airflow limitation with several features usually associated with asthma and several features usually associated with COPD (GOLD & GINA, 2015).

The prevalence of ACOS in patients diagnosed with COPD is approximately 20% and unfortunately is characterized by more frequent exacerbations (Karamitsakos & Gourgoulis, 2016). Patients with ACOS are typically younger with higher comorbidities, disabilities, hospitalizations, and ED visits compared to COPD alone. (Kumbhare, Pleasants, Ohar, & Strange, 2016). If the clinician does not take the time to correctly identify the disease behind the respiratory traits, the patient may be missing appropriate treatments, which could lead to more frequent exacerbations.

Underlying Pathophysiology

ACOS pathophysiology is speculative and contains several different clinical phenotypes and several different mechanisms (GINA, 2017). ACOS involves inflammatory processes that lead to respiratory remodeling, reactive airways, tissue damage and lung hyperinflation. The inflammatory processes include the asthma-like eosinophilic inflammation, yet the COPD-like neutrophilic sputum production may be present (Sin, 2017). A type 2 (T2) helper cell inflammatory pathway seen in asthma has been found in some COPD patients, which brings speculation that these are actually ACOS patients (Sin, 2017). A proinflammatory proteolytic cascade leads to lung tissue breakdown and mild centrilobular emphysema not easily detectable by lung CAT scans, and not a true feature of stand-alone asthma, yet seen in ACOS patients (Gelb, Yamamoto, Verbeke, & Nadel, 2015). Additionally, ACOS patients show less emphysema burden than pure COPD patients (Sin, 2017). These latter mentioned changes cause a loss of lung elastic recoil and therefore hyperinflation of the lungs (Gelb, Yamamoto, Verbeke, & Nadel, 2015).

Figure 1. Hypothetical course of lung function in chronic obstructive pulmonary disease (COPD) and asthma (Postma & Rabe, 2015).



Signs and Symptoms

Signs and symptoms of ACOS involve signs and symptoms of both asthma and COPD:

Asthma signs and symptoms include:

- Variable expiratory airflow
- Wheezing
- Shortness of breath
- Chest tightness
- Cough
- due to bronchoconstriction, airway wall thickening, and increased mucus (GINA, 2017).

COPD signs and symptoms include:

- Dyspnea progressive over time, worse with exercise and persistent.
- Chronic cough w or w/o sputum
- Recurrent wheeze
- Lower respiratory tract infections
- History of exposure to smoke, dusts, vapors, fumes, or gases.
- Family history of COPD and/or childhood factors (GOLD, 2017).

1. Using the signs and symptoms of asthma and COPD, assemble the features that, *when present*, most favour a diagnosis of typical asthma or typical COPD.
2. Compare the number of features on each side.
3. If the patient has ≥ 3 features of either asthma or COPD, there is a strong likelihood that this is the correct diagnosis.
4. When a patient has a similar number of features of both asthma and COPD, consider the diagnosis of asthma-COPD overlap (GINA, 2017).

Significance of Pathophysiology

Inflammation in asthma is affiliated with increases in CD4+ T-lymphocytes and eosinophils. Inflammation in COPD is characterized by increases in CD8+ T-lymphocytes, neutrophils, and macrophages (Wurst, Kelly-Reif, Bushnell, Pascoe, & Barnes, 2016). Treatments for the two diseases are dictated by the underlying pathophysiologies. ACOS, having a mixture of the two, has a unique pharmacotherapy that requires early use of inhaled corticosteroids, which are not typically used in COPD until later in disease progression in stage D (GOLD, 2017).

Stepwise Approach to Care

Table 1. Stepwise Approach to Care (GINA, 2017).

STEP 1						
DIAGNOSE CHRONIC AIRWAYS DISEASE						
Do symptoms suggest chronic airways disease?						
Yes		No → Consider other diseases first				
STEP 2						
SYNDROMIC DIAGNOSIS IN ADULTS						
(i) Assemble the features for asthma and for COPD that best describe the patient.						
(ii) Compare number of features in favour of each diagnosis and select a diagnosis						
Features: if present suggest	ASTHMA	COPD				
Age of onset	Before age 20 years	After age 40 years				
Pattern of symptoms	Variation over minutes, hours or days Worse during the night or early morning. Triggered by exercise, emotions including laughter, dust or exposure to allergens	Persistent despite treatment Good and bad days but always daily symptoms and exertional dyspnea Chronic cough & sputum preceded onset of dyspnea, unrelated to triggers				
Lung function	Record of variable airflow limitation (spirometry or peak flow)	Record of persistent airflow limitation (FEV ₁ /FVC < 0.7 post-BD)				
Lung function between symptoms	Normal	Abnormal				
Past history or family history	Previous doctor diagnosis of asthma Family history of asthma, and other allergic conditions (allergic rhinitis or eczema)	Previous doctor diagnosis of COPD, chronic bronchitis or emphysema Heavy exposure to risk factor: tobacco smoke, biomass fuels				
Time course	No worsening of symptoms over time. Variation in symptoms either seasonally, or from year to year May improve spontaneously or have an immediate response to bronchodilators or to ICS over weeks	Symptoms slowly worsening over time (progressive course over years) Rapid-acting bronchodilator treatment provides only limited relief				
Chest X-ray	Normal	Severe hyperinflation				
NOTE: • These features best distinguish between asthma and COPD. • Several positive features (3 or more) for either asthma or COPD suggest that diagnosis. • If there are a similar number for both asthma and COPD, consider diagnosis of ACOS						
DIAGNOSIS	Asthma	Some features of asthma	Features of both	Some features of COPD		
CONFIDENCE IN DIAGNOSIS	Asthma	Asthma	Could be ACO	Possibly COPD		
STEP 3		Marked reversible airflow limitation (pre-post bronchodilator) or other proof of variable airflow limitation				
PERFORM SPIROMETRY		FEV ₁ /FVC < 0.7 post-BD				
STEP 4		Asthma drugs No LABA monotherapy	Asthma drugs No LABA monotherapy	ICS, and usually LABA +/or LAMA	COPD drugs	COPD drugs
INITIAL TREATMENT*						
*Consult GINA and GOLD documents for recommended treatments.						
STEP 5		• Persistent symptoms and/or exacerbations despite treatment. • Diagnostic uncertainty (e.g. suspected pulmonary hypertension, cardiovascular disease and other causes of respiratory symptoms). • Suspected asthma or COPD with atypical or additional symptoms or signs (e.g. haemoptysis, weight loss, night sweats, fever, signs of bronchiectasis or other structural lung disease). • Few features of either asthma or COPD. • Comorbidities present. • Reasons for referral for either diagnosis as outlined in the GINA and GOLD strategy reports.				
SPECIALISED INVESTIGATIONS OR REFER IF:						

Implications for Nursing

Care

Patients with ACOS often are not given appropriate treatment because ACOS patients are being diagnosed either with COPD or with asthma, leaving part of their underlying disease process untreated (Postma & Klaus, 2015). Because the majority of patients with COPD are diagnosed in the primary care setting, the primary care nurse practitioner (NP) will need to have awareness of ACOS characteristics and a willingness to screen for airway disease in at-risk patients. The primary care NP must ensure proper training for the staff members on calibration of the office based spirometry equipment, and ensure the staff members administering the spirometry testing have proper patient testing technique. With the ACOS being a new diagnosis based on features of two other diseases, it may seem to be easier for the NP to simply "treat the traits" of the disease. Caution is advised against treating the traits, and instead to discern the underlying disease process because ACOS usually has co-morbidities, and treating the traits can lead to polypharmacy (Sin, 2017).

Because ACOS patients report a higher burden of self care and have a higher hospitalization rate, nursing care will have to include assuring the ACOS patient receives timely access to follow up care, assuring the patient has transportation to the appointment, the ability to access medications, has medication device training, and medication reconciliation at each visit (Kumbhare, Pleasants, Ohar, & Strange, 2016). Consideration should be given to the need for homecare nursing visitation to assess the home environment for possible triggers, provide additional medication device training, assess the social support system, and functional abilities in the home.

Conclusion

COPD and asthma are prevalent worldwide diseases. ACOS, the disease that combines characteristics of these diseases, is no longer being ignored. ACOS is a difficult disease to diagnose and comes with a high health care economic cost to society. Understanding and management of ACOS will improve as the disease is increasingly studied. Patient education for self management to improve outcomes and avoid hospitalization will become a large part of the nurse's responsibilities when caring for the ACOS patient.

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