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Review

Comorbidity in chronic obstructive pulmonary disease

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ABSTRACT

Patients with chronic obstructive pulmonary diseases (COPD) often experience comorbid conditions. The most common comorbidities that have been associated with COPD include cardiovascular diseases, lung cancer, metabolic disorder, osteoporosis, anxiety and depression, skeletal muscle dysfunction, cachexia, gastrointestinal diseases, and other respiratory conditions. Not only are comorbidities common but they also considerably influence disease prognosis and patients' health status, and are associated with poor clinical outcomes. However, perusal of literature indicates that little has been done so far to effectively assess, manage, and treat comorbidities in patients with COPD. The aim of this review is to comprehensively narrate the comorbid conditions that often coexist with COPD, along with their reported prevalence and their significant impacts in the disease management of COPD. A perspective on integrated disease management approaches for COPD is also discussed.

Abbreviations: 6MWD, 6-minute walk distance; ATS/ERS, American Thoracic Society/European Respiratory Society; CAD, coronary artery disease; CAT, COPD assessment test; CCM, chronic care model; CHF, congestive heart failure; CPAP, continuous positive airway pressure; CVDs, cardiovascular diseases; GORD, gastro-esophageal reflux disease; HDL, high density lipoprotein; ICS, inhaled corticosteroids; IHD, ischemic heart disease; MetS, metabolic syndrome; mMRC, modified Medical Research Council; OSA, obstructive sleep apnea; SF-36, Short Form-36; SGRQ, St. George's Respiratory Questionnaire

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1. Introduction

Chronic obstructive pulmonary disease (COPD) is a progressive disabling illness associated with an abnormal inflammatory response of the airways and the lung to noxious stimuli [1]. It is characterized by persistent airflow limitation that is not fully reversible and airway inflammation [1]. According to the estimates of the Burden of Lung Disease Initiative (BOLD) study [2], the overall global prevalence of COPD in adults over the age of 40 is 10.1%, with the prevalence being slightly higher in men (11.8%) than women (8.5%). In 2010, nearly 2.9 million people were reported to have died of COPD globally [3]. The illness burden associated with COPD is projected to rise with continued exposure to COPD risk factors [4].

Cigarette smoking is the single most important cause of COPD, with emerging data suggesting the presence of airflow limitation in nearly 50% of smokers [5]. Nevertheless, a significant proportion of patients with COPD are also non-smokers [6]. This is particularly true in developing countries where indoor air pollution such as biomass fuel exposure is most common [7,8]. Nevertheless, even in developed countries between 10% and 30% of COPD patients are believed to be never-smokers [2,9]. Other etiological factors for developing COPD include genetic susceptibility (α1-antitrypsin deficiency) [10], occupational exposure to dust and chemicals such as vapors, irritants, and fumes, severe respiratory infections during childhood [11], and childhood severe asthma [12].

The major pathological changes that cause the inexorable airflow limitation in COPD include remodeling and narrowing of the small airways and destruction of the lung parenchyma [13]. Many converging lines of argument suggest that these pathological changes are secondary to chronic inflammation in the periphery of the lung, which increases as the disease progresses [13,14]. It is now recognized that this inflammation in patients with COPD is not just confined within the lungs and may contribute to the extra pulmonary effects of the disease [15–17]. So whilst COPD primarily affects the lungs, it is a complex, heterogeneous, and multicomponent disease characterized by chronic systemic inflammation and often coexists with other disorders known as comorbidities [15–17]. Comorbidities in COPD are known to pose a challenge in the clinical care of COPD patients, are likely to add to the complexity and cost of care, and are now recognized as key components of the disease [18,19]. Comorbidities that have been associated with COPD include cardiovascular diseases, lung cancer, metabolic disorder, osteoporosis, anxiety and