Chelonian Conservation And Biology

Vol. 17 No.2 (2022) | https://www.acgpublishing.com/ | ISSN - 1071-8443

DOI:doi.org/10.18011/2022.04(1) 2239.2246

IMPACT OF COMORBIDITIES ON THE CLINICAL OUTCOMES OF PATIENTS WITH PULMONARY HYPERTENSION

Razan Khalid Thabit, Dr.Abdullah Sulaiman Alqefari, Dr.Manal Abdulbaqi Alibrahim, Mohammed Ghalab Alanazi, Dr.Abdullah Aedh Alrasheed, Mohammed Qasem Masmali, Easa Wali Umar Magfory, Sultan Mohammed Hamdan Allihybi, Randa Abdulaziz Alkhalaf, Anas Sulaiman Aloraini, Rayan Mohammed Almazroo, Hafez Mohammed Ali Darraj, Batul Ali Mohammed Mahdi, Alaa Hayas Abdullah Alzahrani, Khaled Abdullah Abuhayyah

Abstract

Comorbidities are common in chronic obstructive pulmonary disease (COPD) and have a major influence on patients' quality of life, frequency of exacerbations, and survival. There is a growing body of research indicating that certain illnesses are more prevalent among individuals with COPD compared to the general population. Furthermore, these additional health conditions have a major influence on the overall well-being and prognosis of COPD patients. While the specific processes are yet unknown, it is very probable that many comorbidities arise as a consequence of the persistent inflammatory condition that is characteristic of COPD. Key challenges in the clinical management of COPD are identifying newly emerging comorbidities, assessing the influence of comorbidities on patient symptoms, managing COPD and comorbidities simultaneously, and making precise prognoses. Most comorbidities in COPD should be handled in the normal manner, and the existence of comorbidities seldom affects the specific therapy of COPD. Regrettably, comorbidities often go unnoticed and get inadequate treatment. This analysis specifically examines the prevalence and distribution of 10 significant coexisting medical conditions in individuals diagnosed with chronic obstructive pulmonary disease (COPD). Additionally, we highlight the significant influence on the prognosis and the concerns for managing the condition. This review will emphasize the significance of identifying and managing comorbidity in the care of patients with COPD.

Keywords: prevalence, death rates, chronic bronchitis, emphysema, chronic obstructive pulmonary disease (COPD).

1. Introduction

Chronic obstructive pulmonary disease (COPD) is a respiratory ailment that involves a long-term restriction of airflow and an elevated inflammatory reaction in the airways.1 Comorbidities

are common in individuals with COPD and have a major effect on their quality of life, frequency of exacerbations, and survival. 1, 2 While the specific processes are yet unknown, it is believed that there is a persistent state of inflammation in COPD that speeds up the progression of certain other health conditions. These comorbidities are considered to be a manifestation of COPD as a whole-body illness.3

Currently, there is a lack of clarity in distinguishing between comorbidities and systemic signs of COPD. COPD is characterized by systemic manifestations such as cachexia, skeletal muscular abnormalities, osteoporosis, depression, anemia, and cardiovascular disease. 1 In the context of this study, comorbidities refer to concomitant disorders that are more prevalent in individuals with COPD compared to the general population and/or have a major influence on the treatment or prognosis of COPD patients.

Key challenges in the clinical management of COPD are identifying emerging comorbidities, differentiating between the comorbidity and COPD as the underlying cause of a patient's symptoms, managing COPD and comorbidities simultaneously, and providing precise prognostic assessments. This research specifically examines the epidemiology of 10 significant comorbidities in individuals with COPD. In addition, we emphasize the clinical interaction between each comorbidity and COPD, specifically focusing on prognosis and therapeutic issues.

2. Comorbidities

Prior research has extensively assessed the influence of comorbidities on several aspects such as quality of life, death rates, and treatment alternatives. In the CIRO Comorbidity (CIROCO) research, Vanfleteren et al. examined comorbidities in 213 patients with COPD who underwent pulmonary rehabilitation. 2, 4, 5, 6, 7 Out of all the patients in this group, 97.7% had at least one other medical condition, and 53.5% had been diagnosed with four or more additional medical conditions. While this research made an effort to examine comorbidities, it is possible that the actual incidence of comorbidities was underestimated. This is because patients with unstable COPD and/or specific comorbidities, such as acute myocardial infarction within the last 6 months, were not included in the experiment.

Determining the accurate prevalence of comorbidities in COPD and their correlation with the severity of COPD is complicated by several variables, such as the presence of common risk factors for both COPD and multiple comorbidities.9 The issue of COPD being underdiagnosed has been addressed in 10, 11. Insufficient identification of other health conditions occurring alongside COPD, and characteristics of these additional conditions may be similar to the characteristics used to determine the severity of COPD.12, 13. Therefore, several research examining the occurrence and frequency of comorbidities in COPD suffer from a notable selection bias that is influenced by the population under investigation. This bias partially accounts for the differing occurrence and frequency of common comorbidities seen in various researches.

Notwithstanding these challenges, the majority of research concur that the most common coexisting medical conditions are anxiety/depression, heart failure, ischemic heart disease (IHD), pulmonary hypertension (PHT), metabolic syndrome, diabetes, osteoporosis, and gastroesophageal reflux disease (GERD). In this analysis, we have included lung cancer, pulmonary fibrosis, and chronic kidney disease (CKD) due to their clinical importance in COPD. Figure 1 depicts the relationship between COPD, significant comorbidities, and symptoms.

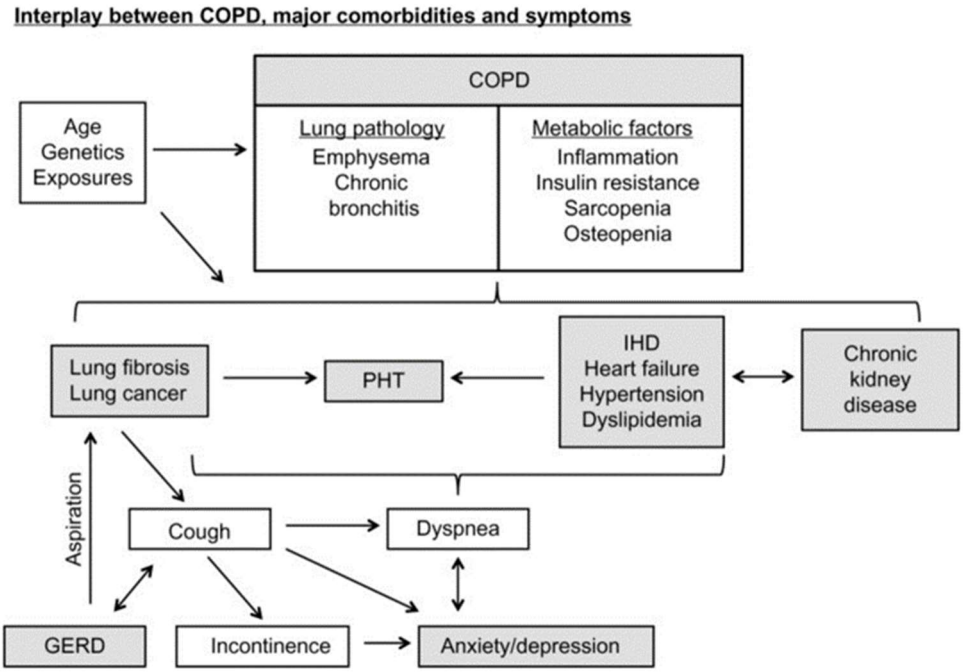

Figure 1. The relationship between chronic obstructive pulmonary disease (COPD), significant coexisting medical conditions, and symptoms.

3. Comorbidities impact on the quality of life

The presence of much comorbidity in people with COPD is associated with a decline in both their quality of life and self-reported health status. Van Manen et al. (2, 14, 15) found that having three or more comorbidities was more strongly associated with health-related quality of life ratings than forced expiratory volume in 1 second (FEV1) or dyspnea. Putcha et al.2 conducted a study to examine the influence of comorbidities on self-reported health status in a sample of 41,658 individuals who participated in the National Health and Nutrition Examination Survey (NHANES) between 2001 and 2008. Each extra comorbidity was associated with a 43% increase in the likelihood of reporting lower self-rated health. Common coexisting medical conditions, including heart failure, diabetes, arthritis, and urine incontinence/prostatic illness, were each linked to a notable reduction in quality of life score. This association remained significant even after accounting for factors such as age, sex, race, and other coexisting medical conditions.

4. Comorbidities increase exacerbations

Multiple comorbidities are linked to a higher frequency of exacerbations, including gastroesophageal reflux disease (GERD), anxiety, depression, pulmonary embolism, pulmonary hypertension (PHT), and cardiovascular disease.7 Moreover, there is a positive correlation between the number of comorbidities and the likelihood of experiencing aggravation and requiring hospitalization. The work is currently ongoing to determine if the comorbidities cause exacerbations, resemble COPD exacerbations, indicate increased severity of COPD, or maybe a mix of these factors.16-19 Regardless of the underlying reason, there is a direct correlation between the presence of several medical conditions and the likelihood of hospitalizations, duration of stay, and death. This correlation applies to both in-hospital and post-discharge situations. 7, 20, 21

5. Comorbidities increase the risk of death

Respiratory failure is the primary cause of mortality in those suffering from severe COPD. According to 5, 22, 23, cardiovascular disease and lung cancer are the prevailing conditions in the first phases of COPD. 5, 23, 24 The investigators of the Towards a Revolution in COPD Health (TORCH) survival study provided a description of the cause of death and determined if it was associated with COPD.25 Only 40% of fatalities were shown to be directly associated with COPD.25 Therefore, conducting thorough examination for the presence of additional medical conditions and effectively treating them might have possibly saved the lives of 60% of those who died due to causes other than the primary cause.

The ECLIPSE study examined 2,164 COPD patients in an outpatient environment and compared them to control groups of smokers and non-smokers to identify predictive surrogate endpoints.4 The presence of certain medical conditions was shown to be strongly related with an elevated risk of death. These conditions included heart failure (hazard ratio [HR]: 1.9), ischemic heart disease (HR: 1.5), general heart disease (HR: 1.5), and diabetes (HR: 1.7). These factors were not influenced by FEV1, BODE index (which includes body mass index, airflow obstruction, dyspnea, and exercise), and exacerbation frequency.4 In addition, the presence of many comorbidities is a separate factor that may predict the likelihood of death from any cause. 4-7 The ECLIPSE study found that the risks of death were twice as high when comparing individuals with three comorbidities to those with none. The odds ratio (OR) rose to 4.57 when comparing the presence of four comorbidities vs the absence of any comorbidities.4 Low health-related quality of life ratings were more accurate predictors of death than the severity of FEV1, which may partially explain this phenomenon.5,6

Divo et al. (3) examined the presence of other medical conditions in a group of 1,664 individuals with chronic obstructive pulmonary disease (COPD) over a period of 51 months. The researchers used the 12 comorbidities that had the greatest hazard ratios (HRs) for death to create a predictive tool known as the COPD-specific Comorbidity Test (COTE) score. The death rate for both COPD and non-COPD causes rose as the COTE scores climbed. A score of 4 or above substantially increased the risk of mortality, with a hazard ratio of 2.3 and a 95% confidence

range of 2.00-2.75 (P<0.001). While more validation of this index is necessary due to the limited sample size of only 186 women in this research, which reduces the reliability of the breast cancer and anxiety components, the fundamental idea that a comorbidity index might forecast mortality and be beneficial in clinical practice shows promise.

6. Pulmonary hypertension (PHT)

Pulmonary hypertension (PHT) is a notable concern among individuals with chronic obstructive pulmonary disease (COPD), with its occurrence varying from 10.2% to 91%. The condition mostly arises from the absence of accurate right cardiac catheter data and the consequent possibility for erroneous classifications. Most COPD patients have mild to moderate pulmonary hypertension (PHT), however there is a subset of people with severe PHT that is disproportionate to the severity of their COPD.26

Hypoxia plays a crucial role in the development of pulmonary hypertension (PHT) by causing the narrowing of blood vessels in the lungs and the remodeling of the pulmonary vasculature, which leads to an increase in resistance to blood flow. Additional variables, including as acidemia, dynamic pulmonary hyperinflation, endothelial dysfunction, polycythemia, inflammation, and parenchymal damage, also play a role in the elevated pulmonary vascular resistance seen in individuals with COPD. In addition, the presence of comorbidities such as heart failure, sleep-disordered breathing, and pulmonary thromboembolism exacerbate the impact of COPD on pulmonary hypertension (PHT). 27,28

Pulmonary hypertension (PHT) is linked to reduced exercise capacity, heightened hospitalization rates, and elevated death rates. FEV1 is less accurate than this predictor in predicting both mortality and exacerbations. Diagnosing pulmonary hypertension (PHT) in chronic obstructive pulmonary disease (COPD) is a difficult task with inherent limitations. However, it is crucial since it directly impacts the way patients are treated and managed. Patients who exhibit a decrease in their 6-minute walk distance, severe oxygen desaturation, or abnormally low gas transfer should be suspected of having pulmonary hypertension (PHT) based on clinical observations. Echocardiography is often regarded as the most effective first diagnostic test, however, the screening process may be enhanced by include an evaluation of the dimensions and performance of the right ventricle. The right cardiac catheterization procedure continues to be the most reliable and widely accepted method for diagnosis. However, it is crucial to thoroughly evaluate the potential risks and advantages for each individual patient. 29

The coexistence of chronic obstructive pulmonary disease (COPD) in patients with pulmonary hypertension (PHT) has a significant effect on the predicted outcome and the factors to be taken into account when deciding on therapy. Medical practitioners must assess the comparative clinical importance of COPD and PHT in each individual and ascertain whether symptoms are primarily caused by the severity of respiratory impairment, cardiovascular dysfunction, or a combination of both. Cardiopulmonary exercise testing may help in evaluating this condition.30

7. Conclusion

To summarize, comorbidities are quite common and contribute significantly to illness and death in people with COPD. Additional investigation is necessary to provide a comprehensive understanding of the connections and fundamental processes between COPD and the many coexisting medical conditions. Additionally, additional study is necessary to ascertain the most effective therapy for comorbidities in the particular population of patients with COPD. It is evident that doctors who specialize in COPD should prioritize not only the treatment of COPD itself, but also the examination and treatment of COPD comorbidities. Screening technologies might perhaps be advantageous in the future to concentrate these findings.

References

1. Global Initiative for Chronic Obstructive Lung Disease (GOLD)Global strategy for diagnosis, management, and prevention of COPD2014 Available from: http://www.goldcopd.org/Accessed June 5, 2014

2. PutchaNPuhanMAHanselNNDrummondMBBoydCMImpact of co-morbidities on self-rated health in self-reported COPD: an analysis of NHANES 2001–2008COPD201310332433223713595

3. DivoMCoteCde TorresJComorbidities and risk of mortality in patients with chronic obstructive pulmonary diseaseAm J Respir Crit Care Med201218621551612256196 4

4. MillerJEdwardsLDAgustiAComorbidity, systemic inflammation and outcomes in the ECLIPSE cohortRespir Med201310791376138423791463

5. SinDDAnthonisenNRSorianoJBAgustiAGMortality in COPD: role of comorbiditiesEur Respir J200628612451257171386 79

6. AlmagroPCalboEOchoa de EchaguenAMortality after hospitalization for COPDChest200212151441144812006426

7. ManninoDMThornDSwensenAHolguinFPrevalence and outcomes of diabetes, hypertension and cardiovascular disease in COPDEur Respir J2008324962969185795 51

8. VanfleterenLESpruitMAGroenenMClusters of comorbidities based on validated objective measurements and systemic inflammation in patients with chronic obstructive pulmonary diseaseAm J Respir Crit Care Med201318777287352339244 0

9. VestboJHurdSSAgustiAGGlobal strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summaryAm J Respir Crit Care Med201318743473652287827 8

10. ManninoDMAguayoSMPettyTLReddSCLow lung function and incident lung cancer in the United States: data from the first National Health and Nutrition Examination Survey follow-upArch Intern Med2003163121475148012824098

11. BalcellsEAntoJMGeaJCharacteristics of patients admitted for the first time for COPD exacerbationRespir Med2009103912931302194277776

12. BegheBVerduriARocaMFabbriLMExacerbation of respiratory symptoms in COPD patients may not be exacerbations of COPDEur Respir J201341499399523543648

13. FabbriLMBegheBAgustiACardiovascular mechanisms of death in severe COPD exacerbation: time to think and act beyond guidelinesThorax201166974574721653929

14. van ManenJGBindelsPJDekkerEWAdded value of co-morbidity in predicting health-related quality of life in COPD patientsRespir Med200195649650411421508

15. YeoJKarimovaGBansalSCo-morbidity in older patients with COPD: its impact on health service utilisation and quality of life, a community studyAge Ageing2006351333716364931

16. HurstJRVestboJAnzuetoASusceptibility to exacerbation in chronic obstructive pulmonary diseaseN Engl J Med20103631211281138208432 47

17. LaurinCMoullecGBaconSLLavoieKLImpact of anxiety and depression on chronic obstructive pulmonary disease exacerbation riskAm J Respir Crit Care Med2012185991892322246177

18. RizkallahJManSFSinDDPrevalence of pulmonary embolism in acute exacerbations of COPD: a systematic review and metaanalysisChest2009135378679318812453

19. WellsJMDransfieldMTPathophysiology and clinical implications of pulmonary arterial enlargement in COPDInt J Chron Obstruct Pulmon Dis2013850952124235822

20. Soler-CatalunaJJMartinez-GarciaMARoman SanchezPSalcedoENavarroMOchandoRSevere acute exacerbations and mortality in patients with chronic obstructive pulmonary diseaseThorax20056011925931160556 22

21. RobertsCMStoneRALoweDPurseyNABuckinghamRJCo-morbidities and 90-day outcomes in hospitalized COPD exacerbationsCOPD2011853543612186411 6

22. McGarveyLPMagderSBurkhartDCause-specific mortality adjudication in the UPLIFT(R) COPD trial: findings and recommendationsRespir Med2012106451552122100536

23. AnthonisenNRSkeansMAWiseRAThe effects of a smoking cessation intervention on 14.5-year mortality: a randomized clinical trialAnn Intern Med2005142423323915710956

24. BerryCEWiseRAMortality in COPD: causes, risk factors, and preventionCOPD20107537538220854053
25. McGarveyLPJohnMAndersonJAZvarichMWiseRATORCH Clinical Endpoint CommitteeAscertainment of cause-specific mortality in COPD: operations of the TORCH Clinical Endpoint CommitteeThorax200762541141517311843
26. SeegerWAdirYBarberaJAPulmonary hypertension in chronic lung diseasesJ Am Coll Cardiol201362Suppl 25D109D11624355635
27. ScharfSMIqbalMKellerCHemodynamic characterization of patients with severe emphysemaAm J Respir Crit Care Med2002166331432212153963
28. ThabutGDauriatGSternJBPulmonary hemodynamics in advanced COPD candidates for lung volume reduction surgery or lung transplantationChest200512751531153615888824
29. MatthayRASchwarzMIEllisJHJrPulmonary artery hypertension in chronic obstructive pulmonary disease: determination by chest radiographyInvest Radiol19811629510072167O9
30. KesslerRFallerMFourgautGMennecierBWeitzenblumEPredictive factors of hospitalization for acute exacerbation in a series of 64 patients with chronic obstructive pulmonary diseaseAm J Respir Crit Care Med199915911581649872834