

**CHRONIC OBSTRUCTIVE
PULMONARY
DISEASE (COPD) AND
COMPLICATIONS
WITH COVID-19:
AN INTEGRATIVE
LITERATURE REVIEW**

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Abstract: Introduction: COPD is presented as the third cause of death, with about 300 million people diagnosed in the world, defined as the presence of persistent respiratory symptoms and airflow limitation due to abnormalities in the airways and/or alveoli. Associated with Covid19, carriers may have lung complications and heart muscle atrophy, allowing the virus to invade the heart and compromise lung function. **Goal:** The present study aims to describe the complications found in patients with COPD contaminated by the coronavirus. **Materials and methods:** This is an integrative literature review, using electronic databases: National Library of Medicine (PubMed), Scientific Electronic Library Online (SciELO) and Physiotherapy Evidence Database (PEDro), in combination with the Boolean operator: "COPD complications AND covid 19", after being evaluated, 09 articles were selected for the sample composition. **Results and Discussion:** It is noticed that in the scientific literature, patients associated with complications of COPD and with a prognosis of COVID-19, had decreased lung function, with signs of emphysema and pneumonia. Consequently, there is the presence of pro-inflammatory cytokines correlated with the frequent diffuse alveolar lesions, with implications for a greater amount of hypoxemia, tachypnea and confusional symptoms, with the presence of snoring and wheezing on pulmonary auscultation. The integration of these elements refer to a worse prognosis for patients and a higher mortality rate. **Final considerations:** Therefore, existing COPD worsens in its progression and the prognosis in the presence of COVID-19 due to the inability to circulate air and capture oxygen, caused by lung abnormalities, impairing lung ventilation, leading to a series of complications and even heart failure. multiple organs.

Keywords: COPD. COVID-19. Complications.

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is defined as the presence of persistent respiratory symptoms and airflow limitation due to airway and/or alveolar abnormalities. It is often caused by significant exposure to harmful particles and gases that impede the passage of air and oxygen uptake by the lung (ANTUNEZ et al 2020).

Epidemiologically, according to WHO data from 2016, COPD is presented as the third cause of mortality, with approximately more than 300 million people diagnosed in the world. This brought worrying prospects for this population in case of contamination by the coronavirus, since it is known that most of those affected live with many comorbidities, among them, systemic arterial hypertension, diabetes, obesity, chronic bronchitis and smoking, signaled as some of the biggest risk references to COVID-19 (SZKLO, 2020; CRINER et al, 2015).

In this context, the family that covid-19 belongs to known as SARS - CoV - 2 especially invades lung alveolar epithelial cells. Although most infections are considered subclinical or mildly symptomatic, the condition can evolve and result in acute respiratory distress syndrome and, consequently, multiple organ failure, since the obstruction of the airways causes the entry and exit of air in the lungs is compromised and, therefore, ends up impairing pulmonary ventilation. Thus, the discomfort when breathing is explained by lung hyperinflation, that is, air retention in the bronchioles and alveoli that hinder gas exchange, absorption of oxygen from the air and elimination of carbon dioxide that the body produces (LIMA, 2020; NOGUEIRA et al, 2018).

Therefore, there is confirmation about the increased expression of ACE-2 (the entry of SARS-CoV-2 into the cell is made significantly through the binding of the Spike protein of the virus with the ACE2 receptor) in the lower airways in their research demonstrates potential for referencing increased risk of severe COVID-19 in these individuals with COPD. (CARDOSO, 2020). Accordingly, some of the possible explanations for why patients with COPD are more likely to contract the severe form and have several implications caused by COVID-19, is that they may have a modified viral immunity in a non-beneficial way, thanks to inhaled corticosteroids which are usually prescribed to this public, and those who are smokers may have increased ACE-2 expression in the lower airways due to tobacco smoke. (DONG et al, 2020; GIRARDIN et al, 2020)

While there is still some variation in the data, the totality of the results indicate that COPD is a significant risk factor for severe COVID-19, increasing the risk from 50% to 100% and leading to poor outcomes, including longer stays in the ICU. intensive care (ICU) and mortality due to the appearance of complications of the condition, which configures a worse clinical prognosis in the same public (TSUTSUI et al, 2021; CARDOSO, 2020).

For those with chronic obstructive pulmonary disease, these changes in lung anatomy and muscle atrophy from COVID-19 bring about heart dysfunction and lung complications. In addition, compromised lung function with signs of emphysema, presence of snoring and wheezing, risk of pneumothorax is observed, and exacerbations associated with the alveolar epithelium can also be found, mainly in smokers (DONG et al, 2020; JACOBS et al, 2020; ANTÚNEZ et al 2020; LEE et al, 2021).

Given the above, the present study aims to describe the complications found in patients diagnosed with COPD contaminated by the COVID-19 virus.

MATERIAL AND METHODS

The related study is an integrative literature review, carried out through the search for scientific evidence in April 2021. Addressing the production stages, from the delimitation of the research question, selection of databases, elaboration of the search strategy, selection of documents and the systematization of scientific results found in the literature on the specific topic (GALVAO; RICARTE, 2019).

The study was carried out in order to gather information and elucidate the existing evidence on Chronic Obstructive Pulmonary Disease (COPD) and Complications with COVID-19, through electronic databases: National Library of Medicine (PubMed), Scientific Electronic Library Online (SciELO) and Physiotherapy Evidence Database (PEDro)

To carry out the research, the following DeCS Science and Health Descriptors were used: "COPD complications" and "covid 19" in English and Portuguese. In addition to using as a search strategy, the combination with the Boolean operator was used: "COPD complications AND covid 19".

The inclusion criteria were primary articles directly related to the descriptors; surveys that addressed cases of COPD; complications in COVID-19; case report; retrospective studies; retrospective cohort studies; cross-sectional study; retrospective observational study; that were available in full online and free of charge; languages in Portuguese, English and Spanish attached in the chosen databases; manuscripts must have been published between 2011 and 2021.

Course completion works were excluded; literature review; complete texts that were not accessible in full for free or that did not address the proposed content; repeated articles; experimental studies with animals; dissertations and theses, that is, documents that were not in article format.

After being evaluated, the works selected for the sample composition had the following variables mentioned: author/year; magazine; kind of study; sample number/average age; purpose of the study; main findings; results obtained and conclusion of the study, the table is organized in chronological order. Figure 1 has a flowchart to better explain the data collection.

RESULTS AND DISCUSSION

During the search in the database, 156 articles were found using the respective descriptor, published between 2011 and 2021, then a thorough reading was carried out and 9 articles were included that met the inclusion criteria for carrying out the bibliographic research.

This study shows that the clinical manifestations of COPD range from asymptomatic cases to patients with mild and severe symptoms, patients who have reduced lung function caused by a respiratory disease with signs of emphysema and pneumonia, in addition to being smokers for over twenty years, diagnosed with hypertension and

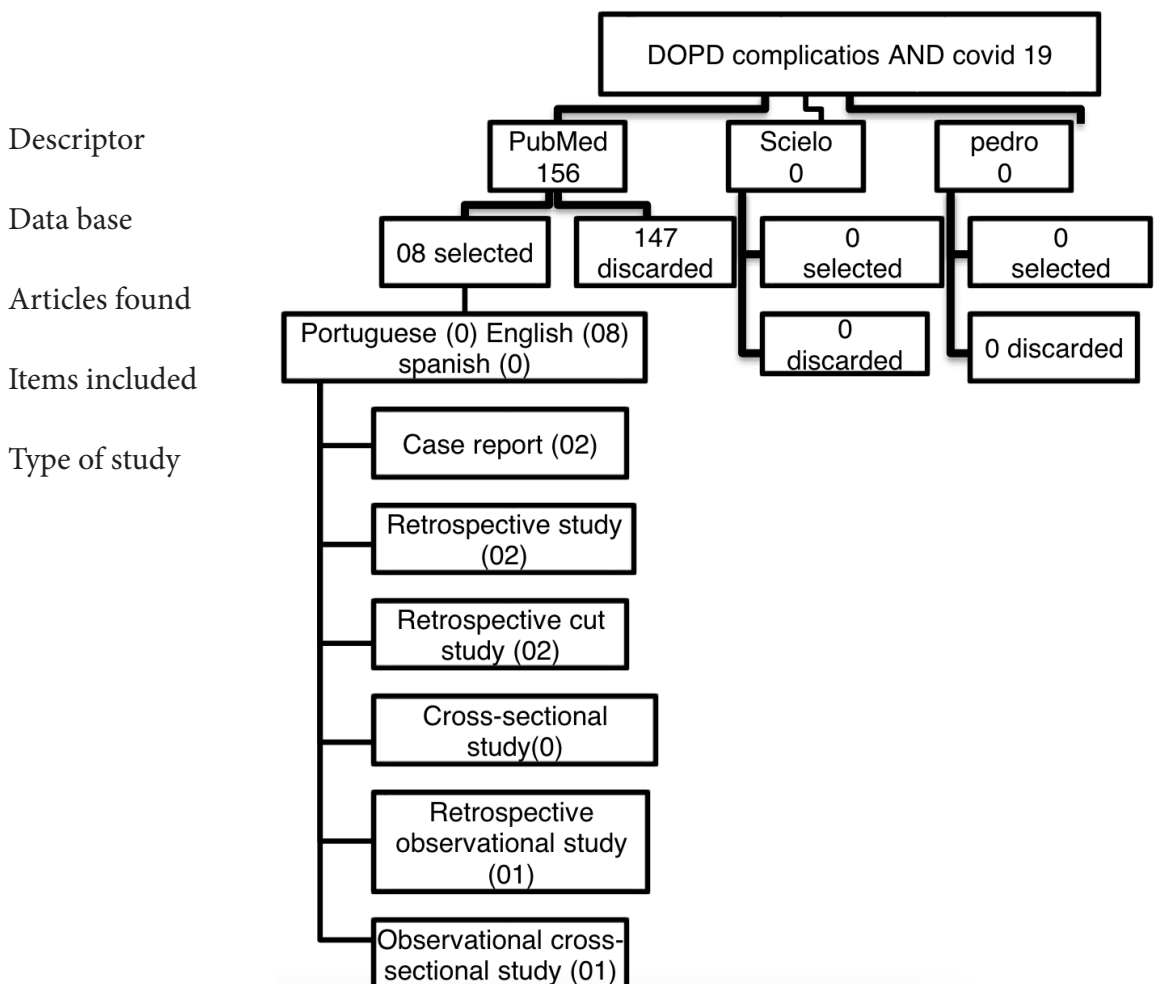


Figure 1- Flowchart of articles included and excluded in the study.

COPD, that is, they had complications that further compromise COVID-19, requiring advanced support measures. (DONG et al, 2020). Corroborating this finding, Wang et al (2020) demonstrated that elderly patients infected with COVID-19 are more likely to be at risk of death, especially when associated with comorbidities such as the cardiovascular disease and COPD, as it promotes increased dyspneic vulnerability, impairing function breathing and leading to lung damage.

Graziani et al (2020) and collaborators reported that patients with COPD are at risk for COVID-19, as tobacco smoke can increase the expression of ACE-2 in the lower airways, therefore, the author states in his analysis that smoking can indeed directly influence COVID-19, further increasing the prevalence of mortality in the population diagnosed with COPD. It was still possible to conclude that the mortality of patients has a predominance of males because they have more comorbidities related to COPD, they smoke more frequently and their conditions progressed to pneumonia according to measurement at hospitalization.

In short, with a longer hospital stay, there may also be an increase in the size and number of consolidations in the lower lobes in individuals, which, in association with the enormous presence of pro-inflammatory cytokines, correlated with the frequent diffuse alveolar lesions caused by COVID-19 can lead to an alveolar rupture and may offer a high risk of pneumothorax to patients with COPD, as argued by Poggiali et al, (2020). In conjunction with these implications, the perspective of Lee et al (2021) attests to COPD as a risk factor for mortality, when analyzing different aspects such as advanced age, prevalent male gender and comorbid and joint pathologies.

Through several works carried out around the world, it was discovered that the angiotensin-converting enzyme 2 (ACE2)

was the cell entry receptor used by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Therefore, it was shown in their research that ACE2 mRNA expression and protein level in lung tissue and bronchial epithelium are significantly increased independently in patients with COPD and current smokers with COPD. It is known that this can explain to a limited extent the exacerbations associated with the alveolar epithelium of smokers at the site of injury in patients in contact with the virus and who have a diagnosis of COPD (JACOBS et al, 2020).

In this sense, Antúnez et al (2020) bring some characteristics that they demonstrated in their research that patients with COPD and COVID-19 presented, in the exams, significant implications of a greater amount of hypoxemia, tachypnea and confusional symptoms, with the presence of snoring and wheezing on pulmonary auscultation. Associated with this, in the radiological part, the appearance of bilateral condensation, bilateral interstitial infiltrates and radiological worsening in one week were consistent with a higher mortality rate of these patients with COPD and COVID-19. Furthermore, negative returns came from prone positioning, non-invasive mechanical ventilation, high-flow nasal cannula or invasive mechanical ventilation without progress in the assisted scenarios. The entirety of these elements referred to a worse prognosis for the sick, supporting this work, the author stated in his study that among patients with COVID-19, COPD was a relevant ally to admission to the ICU including even a higher rate of the presence of the disease in the ICU group in relation to the clinical group, from this perspective, in the end, the logistic regression analysis showed the association of COPD with a higher mortality rate (CALISKAN AND BENGU, 2020).

FINAL CONSIDERATIONS

Based on the studies reviewed in this work, it can be observed that the existing COPD worsens in its progression and the prognosis in the presence of COVID-19, due to the limitation of airflow and oxygen uptake, caused by abnormalities in the airways or alveolar impairing pulmonary ventilation, which may lead to multiple organ failure. In addition, the exacerbations found in this public with both diseases, such as the greater size and number of consolidations in the lower lobes, the presence of pro-inflammatory cytokines that cause alveolar damage, can progress to rupture with the risk of pneumothorax. Still in the clinical history of most of them, tachypnea can also be commonly observed with pulmonary auscultation, increased snoring and increased wheezing and radiological worsening with an evolved incidence in the short term when compared to other patients with COPD, however, not infected by the COVID-19 virus.

From this perspective, in short, it is concluded that patients with COPD after contracting the COVID-19 virus have

higher rates of dyspnea, lymphocytopenia, cardiovascular disease, pneumonia, pneumothorax, poor adherence to medications and risk of developing ARDS. This all results in a large admission to the ICU (intensive care unit) with increased numbers of mortalities.

According to what was discussed, it is necessary to develop new treatment strategies to reach the target audience in order to reduce the risk of immunosuppression, that is, less probability of contamination with COVID-19, in addition to implementing interventions to help mitigate threats from smokers who have other limitations. Furthermore, tracking patients suffering from complications related to COPD and who were contaminated with COVID-19 in order to reduce the incidence of mortality.

In view of this, there is a need to carry out more studies with greater methodological precision addressing the theme of the proposed subject, with the aim of gathering more information about possible complications among patients with chronic obstructive pulmonary disease when assimilated to COVID-19.

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