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Chronic obstructive pulmonary disease and COVID-19

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Abstract:

The coronavirus disease 2019 (COVID-19) pandemic tends to have a more severe clinical picture in the elderly and in patients with chronic diseases, one of which is chronic obstructive pulmonary disease (COPD). Around 2%–3% of patients infected with coronavirus have had the diagnosis of COPD; the critical care, intubation requirement, and mortality rate have been higher among this group of patients with the development of hypoxemia. Exacerbation and COVID-19 pneumonia are two differential diagnoses in patients with COPD; the fever among the symptoms, lymphopenia among the laboratory findings, and typical radiological findings in thoracic tomography of patients may be helpful in the diagnosis of COVID-19. The stabilization of the disease is important in the follow-up of patients with COPD during this pandemic; the continuation of maintenance treatment of patients has been accepted as the main strategy. Droplet and contact transmissions should be decreased, and basic hygiene and nutritional rules should be followed in the COPD patient group in which the risk of infection development is high. There are various opinions on the administration of treatment through nebulizers during the pandemic; the use of inhaler devices is the safer and recommended method. Since noninvasive mechanical ventilators may increase the risk of contamination, they are not included among the routine treatment recommendations for patients with COPD.

Keywords:

Chronic obstructive pulmonary disease, coronavirus disease 2019, treatment strategy

Introduction

Chronic obstructive pulmonary disease (COPD) is currently a significant cause of mortality and morbidity worldwide. Periods of exacerbation result in the progression of the disease, increased health costs and mortality. The primary cause of COPD exacerbations is tracheobronchial infections. Viral infections have been reported to constitute a significant proportion of such infections.^[1]

In light of all this information, it can be understood that COPD patients may be affected in multiple ways during the

coronavirus pandemic. The more advanced age of COPD patients, the cognitive functional impairment associated with advanced age, and the disease itself may negatively affect the patient compliance, especially the infection protection measures. Understanding the new situation and changing patient attitudes and behavior patterns may take time in elderly individuals. Since COPD is a disease process involving chronic respiratory symptoms, a decision to apply to a health institution might be challenging, and similarly, physicians may have difficulty in making a differential diagnosis.

Incidence

COPD and advanced age are conditions

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in which the incidence of other comorbid diseases also increases. The morbidity and mortality of COPD is known to increase with the rising number of comorbidities.^[1]

Different ratios have been recorded in studies from around the world due to the coronavirus disease 2019 (COVID-19). The incidence of COPD has been reported to be 2%–3% among patients who developed COVID-19 pneumonia in the first reports from Wuhan city in China, where the pandemic originated. The last articles reported the incidence of all respiratory diseases with a positive polymerase chain reaction (PCR) test result <1% among over 20,000 cases, which was lower than expected.^[2]

The different accompanying diseases were analyzed in a manuscript evaluating 1590 coronavirus (+) cases in different regions.^[3] The study found that the most important difference among the COPD patients was their more advanced age, higher body temperature, lesser dry cough but increased complaints of sputum, dyspnea, and loss of consciousness when compared to all other patients at admission. During the follow-up, severe disease development with oxygen desaturation, hospitalization in the intensive care unit, intubation, and eventually mortality has been reported to be higher in patients with COPD.

In this case, it can be said that the risk of development of coronavirus pneumonia in COPD patients compared to the normal population is not as high as expected, but the affected cases manifest significant differences in terms of monitorization in the intensive care unit, intubation, and mortality when compared to non-COPD patients.

However, later publications revealed that the incidence of COPD is higher among the accompanying diseases. COPD with the incidence of 18.3% ranked as the 6th, following hypertension, ischemic cardiac disease, diabetes, chronic renal failure, and atrial fibrillation among the accompanying diseases in a study carried out in Italy in April 2020.^[4]

This difference among the cases with COPD may be attributable to the time that passed from the beginning of the pandemic and the reliability of the data, in addition to differences associated with different countries.

Course of the Disease

The most important challenge faced by physicians in clinical application is the differentiation between exacerbation and COVID-19 pneumonia. The differentiation may be even more difficult among

physicians with different levels of experience and in those with an excessive workload. Accordingly, some hints can be provided for the differentiation of these two conditions, which are not absolute. The first is the presentation of the patient with fever. Fever is encountered in one-third of cases with COVID-19, while not being among the most frequent findings of COPD exacerbation. Similarly, dry cough is seen frequently in COVID-19. In addition, it should be kept in mind that the incidence of productive cough in coronavirus (+) COPD cases is higher than in non-COPD cases and, therefore, a dry cough may be seen less frequently.

Of course, imaging evaluation (especially thorax computed tomography) is one of the most helpful methods used in differential diagnosis. Physicians in the field are aware of the radiological appearance of COVID-19, since many reports have been prepared and presented for reference since the start of the pandemic.^[5]

The complete categorization of definitive and possible COVID-19 cases, indecisive cases, and pathologies other than COVID-19 may be possible. At this point, it is important to come to a collaborative decision based on the experience of the radiologist and the clinician, taking into account the radiological–clinical correlation. The most remarkable findings in patients with COPD that develop COVID-19 pneumonia are the overlapping of emphysema, bronchiectasis, peribronchial thickening, possible cardiac pulmonary edema and viral pneumonia, and the development of a different image. A comparison of images with previously obtained images would be helpful at this point. The presence of lymphopenia and PCR for coronavirus is diagnostically important. Data on the presence of eosinopenia as a marker are currently unclear.

Points to be Noted in the Treatment and Follow-Up of a Patient with Chronic Obstructive Pulmonary Disease

Disease stabilization is especially important in this pandemic period in the follow-up of patients with COPD. The leading strategy seems to be the continuation of treatment in patients with stable COPD. The Global Initiative for COPD 2020 has published a report amid the pandemic stating that the cycle of disease management and maintenance treatment was applicable in this period.^[6] In the same report, the opinion that the use of inhaled corticosteroid (ICS) or oral corticosteroids was inappropriate during the COVID-19 pandemic was not based on scientific evidence. Patients using ICS should be told to continue the treatment, and even if it was planned previously to be stopped, as postponing the cessation of the drugs would be more appropriate.^[7]

Although some studies have demonstrated an increased risk of pneumonia through the use of ICS in COPD,^[8] interrupting disease stabilization leads to a more risky situation for the patient. Therefore, it would be more appropriate to plan to make changes in treatments once the coronavirus has lost its efficacy.

A decrease in the frequency of COPD exacerbations would decrease the incidence of hospitalization and would reduce the opportunities to come into contact with a possible COVID-19 patient, thus reducing the possibility of getting infected. To continue the stable course of the disease during the pandemic, it is important for patients with COPD to quit smoking, to have been vaccinated for influenza and pneumococcus, and to continue the maintenance treatment planned for him/her with the right inhalation technique.^[9]

Active cigarette smoking increases mortality due to COVID-19 pneumonia by approximately 14 times.^[10] Patients should be informed of the possible risk of a worsened course of COVID-19 in those with COPD among those who continue smoking. Behavioral and pharmacological methods are at the forefront of treatments to help quit smoking in viral epidemics, and it is reported that the patient can get further help through phone calls, video calls, or the Internet.^[11]

For the pulmonary rehabilitation that is recommended for COPD patients, especially in the B, C, and D groups, getting help from the "online" pulmonary rehabilitation resources is recommended during the pandemic.^[8]

Patients with COPD have to be informed by their primary physician that they should avoid self-medication with antibiotics at home, in the presence of possible symptoms of COVID-19 such as fever and cough or for prophylactic purposes or to decrease the risk of COVID-19.^[8]

Planned follow-up visits are recommended to be postponed if there is no increase in complaints so as not to visit hospitals during this pandemic period. If a patient must attend hospital, it can be recommended they come on their own if possible, or if not possible with a maximum of one family member or caregiver.^[7] In Turkey, in order to reduce the frequency of visits to the hospital by individuals with a chronic disease, patients using drugs prescribed by a physician over the past 6 months for a chronic disease (including COPD patients) can directly visit a pharmacy and obtain their medications (already prescribed together with a sick report) without having to visit a health institution and without a written prescription from a physician. The aim of this procedure, assigned by the Ministry of Health, is to decrease the frequency of hospital visits of patients with COPD and thus decrease the risk of coronavirus

infection to a minimum. For patients who must visit a hospital, it is recommended that an appointment be made beforehand; that they bring their own personal protection, such as masks, when going to the hospital; that they stay at least one meter away from other patients; and that they return home as soon as possible after consulting the physician.

The main measure to be taken to avoid COVID-19 and infection with the possible pathogen for the patients with COPD is to decrease air droplet and contact transmission. Using a mask is recommended for patients with COPD, especially in public places and in enclosed environments, where the risk of infection is higher, in order to avoid contact with droplets in the air.^[9] In general, wearing single-use medical masks or surgical masks is recommended.^[12] It has been reported that N95 mask types should be avoided, since they cause increased sensations of dyspnea and carbon dioxide retention.^[13]

The hand hygiene and personal hygiene recommendations for patients with COPD are similar to the standard recommendations. It should be kept in mind that some disinfectants used in the home may cause irritation of the airway and bronchospasms, and the necessary measures should be taken.

It is recommended that patients with COPD comply with the generally recommended nutrition and lifestyle habits in order to decrease the incidence of COVID-19. Among the main nutrition recommendations are regular and balanced nutrition and adequate vegetable and fruit consumption and drinking liberal amounts of water in particular. At least 6–7 h of daily sleep and moderate exercise at home are also among the recommendations.

Other comorbid diseases, such as hypertension, diabetes mellitus, and coronary heart disease, are also frequent among patients with COPD. It should be kept in mind that the presence of such conditions may increase the risk of development of COVID-19 and mortality from possible COVID-19 pneumonia.^[14] Therefore, the regular use of drugs associated with these diseases should not be neglected.

Inhaler Treatment and Problems with Respiratory Devices

The most important treatment parameter in patients with COPD during the COVID-19 pandemic is the continuation of the regular inhaler treatment they have been prescribed. In addition to the maintenance of inhaler treatment, rescue inhaler devices can be used in cases of increased dyspnea. Daily changes in the medical conditions of patients with COPD during the pandemic should be noted, and symptoms such as high

fever, cough, increased sputum production or dyspnea, weakness, and muscle pain should be followed closely. If complaints continue, the patient should apply to the nearest health institution, especially when there is a persistent fever, increased dyspnea, and cough.

In the presence of a possible or absolute COVID-19 infection, drug administration using a nebulizer is thought to increase the risk of transmission of the disease, therefore, it is stated in some sources that it is inappropriate for patients with COPD to continue their current treatment through this method.^[15] For such patients with COPD, a measured dose of inhaler treatment and administration through connectors such as spacers or an aero chamber can be recommended. However, it was reported as no additional risk in the use of nebulizers by patients, since the aerosol comes through the fluid in the chamber of the nebulizer, and so carries no virus particles from the patient.^[7] The principal recommendation is that patients with COPD should receive their treatment through inhalers. Patients who are unable to use inhaler devices may use the nebulizer device in a well-aerated room, isolated from other family members. The nebulizer should be disinfected frequently and regularly.

The use of noninvasive ventilation (NIV) is quite limited in patients with COPD, even when they are infected with coronavirus and develop tachypnea or hypoxemia, since it increases the spread of the virus in aerosols to other patients and health-care workers.^[16] However, whole face NIV treatment with a helmet mask is recommended in such patients where necessary when there are limited hospital resources, such as intensive care beds and invasive mechanical ventilators.^[16]

The continuation of the standard oxygen treatment that has already been applied is recommended in patients with COPD.^[6] Oxygen treatment should be provided with an oxygen mask in possible or absolute cases of COVID-19.

Furthermore, interventions such as sputum induction and nasotracheal aspiration should be avoided for patients in hospitals, or those with advanced stage COPD, given the high risk of infected aerosols and COVID-19 transmission. If mandatory, the procedure should be undertaken only after taking the necessary precautions.

Conclusion

Although the incidence of COVID-19 is not that high among patients with COPD, the course of the disease can encounter frequent complications and high mortality in cases with COPD when it develops. The differentiation

between COPD exacerbation and COVID-19 pneumonia should be made carefully in patients with COPD. The main strategy in the follow-up of patients with COPD is the protection of a stable course of disease without changes in the maintenance treatment. Daily changes and newly developed symptoms should be noted in patients with COPD in whom the risk of infection is high, and protective measures should be strictly observed.

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Conflicts of interest

There are no conflicts of interest.

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