Chronic obstructive pulmonary disease (COPD) refers to limitation of air flow and presence of persistent respiratory symptoms due to abnormalities in the airway or alveolar airway. COVID-19 patients with COPD have a higher mortality and morbidity. Recent studies revealed that present smokers have a higher risk mortality rate than the former and never smokers. However, COPD patients infected with SARS-CoV-2 have a low survival rate during the COVID-19 pandemic. Here we present a case of COVID-19 in a patient with COPD. The patient presented with shortness of breath, altered mental status, and loss of consciousness and 3 days prior was diagnosed with COVID-19, by reverse transcription polymerase chain reaction. The patient diagnosed by physical, and laboratory findings, and treated by giving 2 L/min oxygen on a ventilator pressure control ventilation mode, with administrated antibiotic, antipyretic, proton pump inhibitors, and mucolytic drugs without complications. COVID-19 incidence is increased when there are other illnesses present, such as COPD. Based on 18 studies of 26,075 cases reporting, COPD was significantly associated with an increased risk of adverse outcomes in COVID-19 patients, particularly current smokers. We report a case of COVID-19, heavy smoker with a 1-year history of COPD with a positive outcome. The patient suffered from severe respiratory failure, requiring the use of ventilation gave 2 L/min oxygen on pressure control ventilation mode. Our findings suggest that the development of COVID-19, which could lead to death, needs critical assessment and special consideration for COPD patients and existing smokers.

Keywords: COVID-19, Chronic obstructive pulmonary disease, Case report, Review literature, SARS-CoV-2, Coronavirus
nations of low and moderate income. To date, few reports of COVID-19 in patients with COPD have been reported in the literature.

We present a case report of COVID-19 in a patient with COPD. To the best of our knowledge, this is a first case report in the Iraqi population. The report was prepared according to the SCARE 2020 guidelines[7].

**Patient information**

A 70-year-old man brought by in ambulance to the COVID-19 Centre at Rania Teaching Hospital Kurdistan-region Iraq presenting with shortness of breath, confusion and sudden unconsciousness, with a 1-year history of COPD, with no past medical, and surgical history. He was a heavy smoker; with a 58 pack-year history. He had been prescribed to use azithromycin tablet and salbutamol inhaler was recommended by his general practitioner GP. His body mass index was 28.7 kg/m².

**Clinical findings**

Upon arrival, the patient’s temperature was 38.4°C normal range (35.5–37.5°C), Blood pressure (BP) was 141/83 mm Hg, normal range (120/80 mm Hg), respiratory rate was 26 per minute, pulse rate 102 bpm and the patient oxygen saturation (SPO2) was 68% at rest without oxygen, and Glasgow Coma scale for our case was 3.

**Diagnostic assessment**

Furthermore, laboratory test results showed elevated leukocytes $15.3 \times 10^9/L$ (normal range $3.5–9.5 \times 10^9/L$), lymphocyte $0.94 \times 10^9/L$ (normal range $1.1–3.2 \times 10^9/L$), blood platelet $100 \times 10^9/L$ (normal range $125-350 \times 10^9/L$), neutrophils $3.58 \times 10^9/L$.
In addition, the arterial blood gas analysis (ABG) for this patient showed PH = 7.36, PaO2 = 55.2 mm Hg, PaCO2 = 46.2 mm Hg, FiO2 = 0.43, and P/F ratio = 128.3. The D-dimer = 5717 ng/ml. The patient was negative respiratory adenovirus, para influenza viruses, and syncytial virus. In addition, the patient was diagnosed with COVID-19 3 days before admission.

**Therapeutic intervention**

The patient was immediately transferred to intensive care unit (ICU) and endotracheal intubation was performed to receive ventilator management for 3 days duration (Fig. 1). On fourth day of the patient illness the tracheostomy was performed, and gave 2 L/min oxygen on ventilator pressure control ventilation mode with FiO2 = 0.5, positive end expiratory pressure = 8, tidal volume 500 without complication, and his SPO2 was 92%, with administered antibiotic ceftriaxone vial 1 mg for 3 days duration, antipyrctic, proton pump inhibitors and mucolytic drugs. In addition, on fifth day Foley catheter and nasogastric tube (NG) had been inserted. After 7 days from unconsciousness the patient oxygen (SPO2) suddenly increased to 92% without oxygen therapy. Ventilator had been removed on the patient at 10th day. At the 14th day the patient discharged to home on medical treatment with tracheostomy tube (Fig. 2). On the 18th day the tracheostomy tube removed (Fig. 3).

**Follow-up**

The patient was released for outpatient monitoring.

**Discussion**

One of the significant strengths of the present paper is that we did not use systemic corticosteroids as a treatment because the patient did not have COPD exacerbation; however, systemic corticosteroid treatment is not recommended in cases of COPD exacerbation because it can cause steroid-related complications, secondary infections, and delayed viral shedding[8]. This particular case was one of the unusual COVID-19 COPD cases. More importantly, this is one of the few examples of COVID-19 patients diagnosed with COPD surviving, as COPD is a major risk factor for hospitalization, ICU stays as well as COVID-19 patients mortality[9]. Spirometry is recommended for COPD diagnosis, which may be a flaw in this case report, despite the fact that other studies have shown that it can lead to aerosol infections[10]. In our case, respiratory adenovirus, para-influenza virus, and syncytial virus were all negative in. In addition, 3 days before admission, the patient was diagnosed with COVID-19. Based on 18 studies of 26,075 cases reporting, COPD was significantly associated with an increased risk of adverse outcomes in COVID-19 patients[11]. However, our patient has a great outcome, and survived. COVID-19 incidence is increased when there are other illnesses present, such as COPD[12].

### Table 1

**COPD patients infected with SARS-CoV-2 and their managements reported in the literature.**

| References   | Country   | Age/Sex       | Chief Complain                              | Management                                                                 | Outcome       |
|--------------|-----------|---------------|---------------------------------------------|---------------------------------------------------------------------------|---------------|
| Arnold et al[14] | USA       | 53-year-old male | Worsening dyspnea and hypoxia               | Azithromycin and steroids, placed on NIPPV with improvement              | Discharged    |
| Inoue et al[15] | Japan     | 58-year-old male | Fever and progressive dyspnea              | Systemic corticosteroid, Prednisolone 30 mg, favipiravi                 | Discharged    |
| Poggiali et al[16] | Italy     | 87-year-old male | Worsening dyspnea without cough or fever    | The patient refused all therapeutic options, including intubation         | The patient died 48 d after admission from COVID-19-related ARDS | Discharged    |
| Kuzeva et al[17] | United Kingdom | 77-year-old male | Shortness of breath, fever, cough, and corvial symptoms | Oxygen therapy, intravenous methylprednisolone 40 mg (0.5 mg/kg), steroid treatment | Discharged    |
| Miwa et al[18] | Japan     | 78-year-old male | Dyspnea                                    | NA                                                                        | NA            |
| Our case report | Iraq      | 70-year-old male | Shortness of breath, confusion, and sudden unconsciousness | Oxygen therapy on a ventilator PCV mode, with administered antibiotic, antipyrctic, PPI, and mucolytic drugs | Discharged    |

PCV indicates pressure control ventilation; PPI, proton pump inhibitors.
Because of their low underlying lung reserve and increased expression of angiotensin-converting enzyme (ACE-2) receptors in the small airways, patients with chronic respiratory diseases, especially COPD, are at high risk for COVID-19 infection\textsuperscript{[13]}. To date, few reports of COVID-19 in patients with COPD have been reported in the literature (Table 1).

COPD patients have felt the effects of the pandemic in a variety of ways. Face-to-face outpatient visits with their doctors, as well as pulmonary therapy sessions and COPD home visit programs, have been reduced. Patients who would usually present to the hospital during an exacerbation may opt to stay at home for fear of being exposed, causing treatment to be delayed, if it has in other cases such as myocardial infarction\textsuperscript{[19]}.

The explanation for COVID-19’s disproportionate impact on COPD patients is unknown. It is feasible that the chronic existence of COPD, as well as the severity of lung dysfunction and concomitant low-grade inflammation, weaken immune systems and predispose to acute respiratory infections without timely and appropriate care\textsuperscript{[20]}. For COPD patients who recovered from COVID-19, it is vital to undergo physical therapy and rigorous nutrient supplementary regimens. In addition, palliative care is another option to support patients with COPD.

COVID-19 infection has been linked to significant severity and mortality rates in COPD, according to recent studies, present smokers have a higher risk of major complications and a higher mortality rate than former and never smokers\textsuperscript{[21]}. The clarification for the differences in how COPD patients and smokers display the machinery needed for SARS-CoV-2 cellular entry has been discovered. In COPD patients, ACE-2 expression was significantly higher than in control subjects\textsuperscript{[19]}.

In contrast, a systematic review found that patients with COPD do not appear to be at significantly risk of infection with SARS-CoV-2, likely reflecting the impact of protective strategies, at least in part. Chronic respiratory disorder has not been shown to be an independent risk factor for testing positive for SARS-CoV-2 in most studies of symptomatic people in the healthy and COPD population\textsuperscript{[22]}. On the other hand, a study found that corticosteroids are safe and effective in asthma and COPD patients, both with and without COVID-19\textsuperscript{[23]}. The limitation of this study is only one case have been discussed. Over 250 million people worldwide suffer from COPD, with millions more undiagnosed. COPD is a lung disease marked by chronic airway inflammation and restricted airflow. Globally it is the third leading cause of death\textsuperscript{[6]}. However, COVID-19 patients with COPD have as increased mortality rate. In order to limit the progression of symptoms and reduce flare-ups, early identification and treatment, including smoking cessation support, is important. Moreover, all COPD cases not changed into exacerbation by COVID-19, respectively. Further studies are required to management of COPD in COVID-19 patients.

**Highlights**

1. The world’s third largest cause of mortality is COPD.
2. COPD patients infected with SARS-CoV-2 have a higher mortality and morbidity.
3. In patients with COPD, oxygen therapy, Azithromycin, and systemic corticosteroids have a good clinical outcome.
4. In order to limit the progression of symptoms and reduce flare-ups, early identification and treatment, including smoking cessation support, is important.

**Conclusion**

We report a case of COVID-19, in a heavy smoker with a 1-year history of COPD with a positive outcome. The patient suffered from severe respiratory failure, requiring the use of ventilation gave 2 L/min oxygen on pressure control ventilation mode. Our findings suggest that the development of COVID-19, which could lead to death, needs critical assessment and special consideration for COPD patients and existing smokers. In order to limit the progression of symptoms and reduce flare-ups, early identification and treatment, including smoking cessation support, is important. There are various steps that persons with COPD can take to improve their general health and assist regulate their COPD such as, stop smoking, get vaccinated against pneumonia, influenza, and coronavirus. Patients with COPD need to be informed about their conditions, treatment and self-care.

**Ethical approval**

Ethical approval has been given by the ethics committee of our faculty.

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**Author contribution**

R.A.E. and S.K.A.: conception and design, execution, analysis and interpretation of data, involved in drafting the article, revised it critically for important intellectual content, and interpretation of data, read and approved the final version of the manuscript. D.H.B.: involved in drafting the article, revised it critically for important intellectual content, and interpretation of data, read and approved the final version of the manuscript. C.P.A., S.A.R. and A.A.K.: involved in drafting the article, revised it critically for important intellectual content, read and approved the final version of the manuscript.

**Conflicts of interest disclosure**

The authors declare that they have no financial conflict of interest with regard to the content of this report.

**Research registration unique identifying number (UIN)**

Not applicable.

**Guarantor**

Dr. Rawand A. Essa, and Registered Nurse Sirwan K. Ahmed: accept full responsibility for the work and the conduct of the study, had access to the data, and controlled the decision to publish.

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