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A case developing bilateral bullae due to COVID-19 infection and operated for recurrent pneumothorax

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ABSTRACT

In December 2019, a novel coronavirus (COVID-19) pneumonia emerged in Wuhan, China and has rapidly spread to multiple countries worldwide. Pulmonary parenchymal opacities are often observed during chest radiography. Pneumothorax was reported in 1% of patients in studies. In this paper, we aimed to present a patient with a history of long-term hospitalization in intensive care unit due to COVID-19 pneumonia who was operated for right recurrent pneumothorax secondary to COVID-19 after discharge.

Keywords: COVID-19, pneumothorax, pneumonia

By the end of 2019, a new type of coronavirus (SARSCoV-2) was identified in the city of Wuhan, within the state of Hubei, China and the pandemic caused by this virus affected the entire world. Coronavirus Disease 2019 (COVID-19), is a highly contagious disease with that spreads rapidly [1]. Bilateral ground glass opacities in computed tomography (CT) of thorax is the most frequently seen radiological finding typical for COVID-19. Atypical findings such as bullae and pneumothorax are seen in progression of the disease and it is reported that pneumothorax develops in 1-2% of the patients [2].

In those with COVID-19 infection, pneumothorax was reported in cases without a medical history of underlying lung disease as well. Hence, pneumothorax should be considered in case of sudden development of respiratory distress in patients followed-up for COVID-19 pneumonia [3]. Although the etiopathogenesis of pneumothorax is not fully known in these cases, inflammation with high-level intensity for a certain period of time is thought to cause pneumothorax and/or pneumomediastinum development in addition to severe injury of pulmonary parenchyma [4].

In this paper, we aimed to present a patient with a history of long-term hospitalization in intensive care unit due to COVID-19 pneumonia who was operated for right recurrent pneumothorax secondary to COVID-19 after discharge.

CASE PRESENTATION

Male patient at the age of 42 applied to the hospital with shortness of breath on the 1th of December 2020.

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Clinical investigations led to the diagnosis of COVID-19 pneumonia and the patient was internalized to the intensive care unit (ICU) of the hospital due to low oxygen saturation. The patient had a history of chronic obstructive pulmonary disease (COPD), idiopathic pulmonary fibrosis (IPF) and deep vein thrombosis (DVT). He had been taking inhaler treatment for COPD since 2017. The patient has received treatment in the ICU for about 66 days, 33 of which he spent intubated on a ventilator. The patient was discharged on 12th of February 2021. No pneumothorax was detected in chest x-rays during his ICU stay. The patient applied to the emergency unit with chest pain and shortness of breath on 24th of February 2021 and total pneumothorax on the left lung was detected as a result of clinical investigations. The patient was internalized and left-sided tube thoracostomy was applied. Chest tube was discontinued on the 6th day of follow up and the patient was discharged. He experienced chest pain and shortness of breath once again on 14th of May 2021. Total pneumothorax on the right lung was detected after clinical investigations. He was internalized and right-sided tube thoracostomy was applied. After 12 days of follow up with chest tube, the tube was discontinued and the patient was discharged on 25th of May 2021. The patient applied to our hospital with chest pain on 4th of June 2021 and right pneumothorax was seen on chest x-ray. The patient was internalized to our inpatient clinic and tube thoracostomy was applied for recurrent right pneumothorax (Fig. 1). Computed tomography (CT) of thorax indicated bullae in middle lobe of right lung and lingular segment of left lung (Fig. 2). No bullae was detected in the patient's thoracic CTs prior to COVID-19. The patient was operated on 7th of June 2021. VATS was used to enter the thoracic cavity via right chest tube incision. Bullae on middle lobe was detected upon exploration. An incision of 2 centimeters in length was applied where anterior axillary line meets 3rd intercostal space (ICS). An endostapler was placed under the bullae on middle lobe, but since the stapler would not unlock after cutting, utility incision was switched to mini-thoracotomy in order to prevent parenchymal injury. Linear stapler

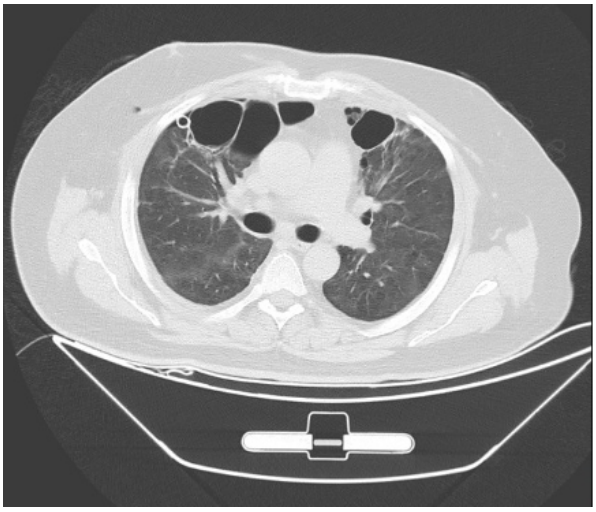

Fig. 2. On thorax CT, bullae are observed in the middle lobe of the right lung and the lingular segment of the left lung.

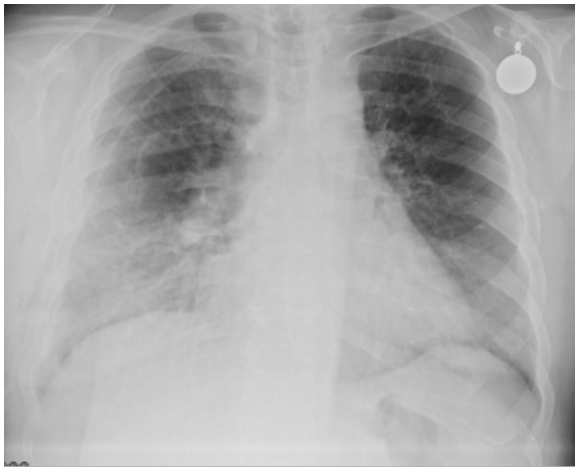

Fig. 1. In the posteroanterior chest radiograph of the patient who underwent tube thoracostomy due to right recurrent pneumothorax, a bullous appearance is observed in the right middle zone.

Fig. 3. Chest X-ray of the patient on the first postoperative day.

was placed under the endostapler that was stuck and wedge resection was completed. Partial pleurectomy was applied afterwards. The patient was internalized to intensive care unit for postoperative follow up and no complication such as hematoma or atelectasis was seen on chest X-ray (Fig. 3). The patient was transferred to the inpatient clinic from ICU on postoperative day 1. The basal drain was discontinued on postoperative day 2. Upon observation of no drainage or air leakage, chest tube was discontinued on postoperative day 4 and the patient was discharged. No complication was seen in postoperative follow up of the patient.

DISCUSSION

Pneumothorax is defined as free air inside visseral and parietal pleural linings due to various reasons. It may be spontaneous or secondary to various etiologies such as traumatic, inflammatory, infective, malign, genetic or hormonal causes [5].

Alveolar rupture and diffuse alveolar injury causing air leakage is the predicted pathophysiologic mechanism for pneumothorax development in COVID-19 [6]. Barotrauma due to increase in intrathoracic pressure during intense episodes of cough is also thought to cause pneumothorax development in patients with alveolar structure previously damaged by infection [7]. The development of emphysematous bullae or cavities is thought to probably be caused by endothelial inflammation as a result of pulmonary infarcts [8].

Retrospective studies on COVID-19 patients has shown that pneumothorax may develop in 1% of patients requiring internalization and 2% of patients requiring intensive care [9, 10]. In the large sample study of Martinelli *et al*. [11] development of pneumothorax was reported in 60 patients (0.91%) out of 6574. Bıçak and Salık [12] detected pneumothorax in 11 patients out of 2680 and reported the prevalence for pneumothorax development as 0.41%.

Gonzáles-Pacheco *et al*. [13] have reported development of bilateral pneumothorax 17 days after diagnosis of non-complicated COVID-19 in a previously healthy 45 year-old male. In our patient pneumothorax was detected in left lung 86 days after diagnosis of COVID-19, and it was detected in right lung 135 days later. The patient was operated for recurrent pneumothorax on right lung in addition to bilateral bullae detected on thoracic CT, 169 days after the initial diagnosis of COVID-19.

The existence of bullous lung disease throughout the course of COVID-19 infection is rarely reported. It has been reported that some patients had round cystic changes on thorax CT, which led to the development of bullae after resorption of consolidation. However, bullous lung disease has been described less frequently and only a few cases have been reported in the literature [14].

CONCLUSION

In conclusion, spontaneous pneumothorax is a rare complication of the COVID-19 viral pneumonia. It may appear at any time throughout the course of the disease. In addition, bullous lung disease is scarcely reported. Pneumothorax as a rare but deadly complication of this disease should be considered in the follow up of COVID-19 patients especially in those with sudden respiratory distress. Clinicians should be careful regarding the diagnosis and treatment of this complication.

Authors' Contribution

Study Conception: İY, EEK;CAB; Study Design: EEK, İY; Supervision: EEK, İY, CAB, SAB; Funding: EEK, KAB; Materials: SAB, KAB, İY; Data Collection and/or Processing: İY, KAB; Statistical Analysis and/or Data Interpretation: EEK; Literature Review: EEK; Manuscript Preparation: EEK and Critical Review: CAB, İY, SAB, EEK.

Conflict of interest

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.

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