

Relapsing Secondary Spontaneous Pneumothorax during COVID-19 infection

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ABSTRACT

Objective: COVID-19 infection has been reported to cause spontaneous pneumothorax with variable clinical manifestations and prognoses. We would like to present a case of a patient who developed spontaneous pneumothorax during COVID-19 infection.

Case Presentation: A 40-year-old male patient developed spontaneous pneumothorax during COVID-19 infection. A prolonged air leak developed and the patient was discharged with a Heimlich valve. Then the pneumothorax relapsed twice. The surgical treatment of pneumothorax was postponed because of a persistently increased state of inflammation secondary to COVID-19 infection. Our patient recovered completely with carefully timed surgical intervention.

Conclusion: Surgery for the treatment of cases with pneumothoraces during COVID-19 infection has been reported to be as low as 2% compared to 25% in standard pneumothorax admissions. This might be secondary to the generally less favorable general conditions and higher morbidity and mortality of the COVID-19 patients in contrast to the general population who develop spontaneous pneumothorax. The diagnosis and management of these patients may become challenging as symptoms and signs of spontaneous pneumothorax tend to be similar to COVID-19 and these patients may require tailored management.

Keywords: Pneumothorax, COVID-19, Thoracic Surgical Procedure

INTRODUCTION

COVID-19 infection has been reported to cause spontaneous pneumothorax with variable clinical manifestations and prognoses (1). We would like to present a case of spontaneous pneumothorax in a patient who developed during COVID-19 infection and recovered completely with carefully timed surgical intervention.

Case Presentation

A 40-year-old male patient presented to the emergency department with complaints of right-sided chest pain and difficulty in breathing. His medical history revealed that these complaints started 3 hours before admission. His chest pain aggravated with inspiration, and he was on the eighth day of COVID-19 treatment. His past medical history revealed no chronic disease or medication, but he was smoking a pack of cigarettes/day for 20 years and he has been diagnosed priorly with a bulla of 5x3 cm diameter on his right middle lobe (Figure 1). His blood pressure was 138/96 mm Hg, heart rate was 114/min, fever was 36,8°C, and respiratory rate was 38/min. He had severe dyspnoea. His physical examination revealed diminished right-sided respiratory sounds on lung auscultation. Other routine examinations revealed no additional abnormality. His Thoracic Computer Tomography (CT) revealed a right-sided pneumothorax (Figure 1).

Chest tube thoracostomy was performed, and the patient was hospitalized at the COVID-19 clinics. He had a prolonged air leak for ten days and was transferred to the Thoracic Surgery Clinics. The chest tube was replaced with a 36 Fr Pezzer drain, and the drain was connected to a Heimlich valve. The patient was discharged from the hospital on his 13th day. After a 2-week outpatient clinic follow-up, the Pezzer drain was removed from the patient as his right lung was completely expanded and the air leak stopped. The patient has been re-admitted to the Thoracic Surgery outpatient clinics with a relapsing right-sided pleuritic chest pain and dyspnoea one week after the removal of the chest drain. His posterior-anterior (PA) chest x-ray revealed recurrent right-sided pneumothorax and fibrothorax with an elevated right diaphragm (Figure 2).

Case Report Article

Received 18-04-2022

Accepted 16-05-2022

Available Online: 30-05-2022

Published 30-05-2022

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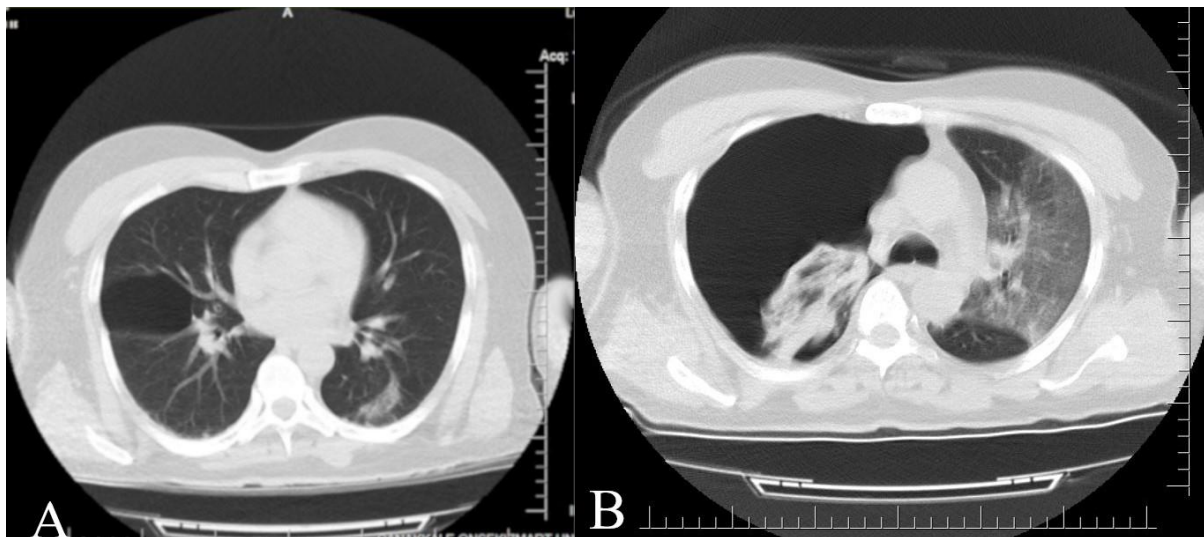


Figure 1: A) CT image revealing bulla on the right middle lobe. B) CT image revealing the right-sided pneumothorax.

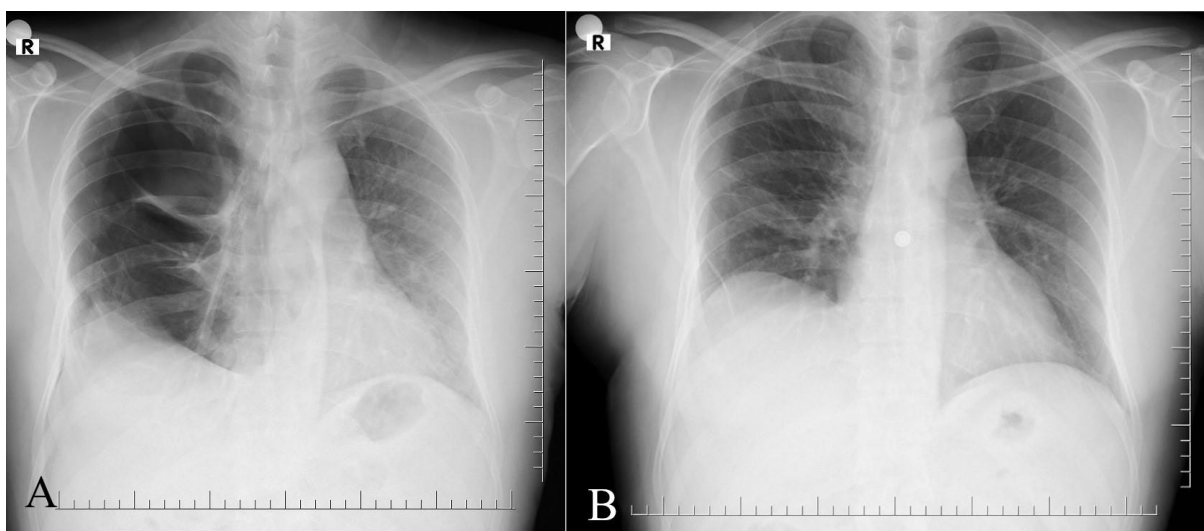


Figure 2: A) PA chest x-ray revealing recurrent right-sided pneumothorax and fibrothorax with an elevated right diaphragm. B) PA chest x-ray of the patient on his 10th postoperative month.

He had leucocytosis (14000/mm³), an elevated C-reactive protein, and a d-dimer value (respectively). The patient was hospitalized, but as his laboratory tests still revealed an increased state of inflammation, the spontaneous pneumothorax surgery was postponed, and a right-sided chest tube thoracostomy was performed instead with a 28 Fr Pezzer drain. The right lung re-expanded, the drain was removed on the fifth day, and the patient was discharged on the sixth day of hospitalization. Two weeks later, the patient was re-admitted to the outpatient clinics with dyspnoea and recurrent right pleuritic chest pain. PA chest x-ray revealed a recurrent right-sided pneumothorax. The patient was hospitalized, and pre-operative preparations were performed. Total decortication of the right lung and bullectomy with a right postero-lateral thoracotomy was performed on the bulla with the dimensions of 5x3 cm on the right middle lobe which has been detected 2 years before the development of pneumothorax. The patient was discharged from the hospital on the seventh day. The patient is still being followed up in the 10th postoperative month (Figure 2).

DISCUSSION

Pneumothorax has been defined as the pathological presence of air in the pleural cavity (2). Although the main clinical presentation of COVID-19 infection includes fever, cough, and dyspnoea 1-2% of COVID-19 patients have been reported to develop pneumothorax (3). Pneumothorax has been reported in both mechanically and non-mechanically ventilated patients with COVID-19 infection (4).

Cases of pneumothorax that occurred during the COVID-19 infection are usually male patients and more than half of them are older than 60 years of age and never-smokers (4). Our case was male but differed in contrast to these findings as he was 40 years of age and was an active smoker.

The most common symptoms and signs of pneumothorax during COVID-19 infection are fever, cough, dyspnoea, and pleuritic chest pain (3). Among these symptoms, only pleuritic chest pain can lead the physician to the diagnosis of pneumothorax.

Approximately 30% of these patients who develop pneumothorax present a change in clinical condition, as in our patient (3).

Patients who develop pneumothorax during COVID-19 infection are treated in the same fashion as other pneumothoraxes. It has been reported that almost 90% of the patients who develop pneumothorax during COVID-19 infection are treated either conservatively or with chest tube thoracostomy (3). We tried to treat our patient with chest tube thoracostomy but failed to achieve complete remission. Thus we started to treat our patient with surgery. Surgery for the treatment of pneumothoraxes during COVID-19 infection has been reported to be as low as 2% compared to 25% in standard pneumothorax admissions (3,5). This might be secondary to the generally less favourable general conditions and higher morbidity and mortality of the COVID-19 patients in contrast to the general population who develop spontaneous pneumothorax.

Prognosis of patients with spontaneous pneumothorax has usually been reported in terms of recurrence rather than mortality. The estimated recurrence rate after the first pneumothorax is reported to be up to 50% over a one to five-year follow-up period. The risk of recurrence is the highest in the first 30 days following the first episode which is similar to our patient as his first recurrence developed in the first month of follow-up (6). The recurrence rates of pneumothorax during COVID-19 infection remain obscure as no article is present yet to report findings of the long-term follow-up of these patients.

The exact mortality in spontaneous pneumothorax has not been reported (6). Despite pneumothorax cases that develop during COVID-19 infection can be as high as 30%, articles on this topic do report that pneumothorax in COVID-19 patients with ARDS has higher mortality. However these articles do not report pneumothorax as the exact cause of death in these patients. Nevertheless, pneumothorax is reported as a contributing factor to mortality in COVID-19 patients (4).

CONCLUSION

In conclusion, pneumothorax can develop in COVID-19 patients. The diagnosis and management of these patients may become challenging as symptoms and signs of pneumothorax tend to be similar to COVID-19, and these patients may require tailored management.

Author Contributions: NE, MZÖ, İEG: Concept, Data collection and/or processing, Analysis and/or interpretation, Literature review, Writing, Revision.

Conflict of interest: The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. This article did not receive a specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical approval: All procedures performed in this study were in accordance with the ethical standards of the institutional research committee.

REFERENCES

1. Wang W, Gao R, Zheng Y, Jiang L. COVID-19 with spontaneous pneumothorax, pneumomediastinum and subcutaneous emphysema. *J Travel Med.* 2020 20;27(5):taaa062. doi: 10.1093/jtm/taaa062.
2. Huan NC, Sidhu C, Thomas R. Pneumothorax: classification and etiology. *Clin Chest Med.* 2021;42(4):711-727. doi: 10.1016/j.ccm.2021.08.007.
3. Quincho-Lopez A, Quincho-Lopez DL, Hurtado-Medina FD. Case Report: pneumothorax and pneumomediastinum as uncommon complications of COVID-19 Pneumonia-Literature Review. *Am J Trop Med Hyg.* 2020;103(3):1170-1176. doi: 10.4269/ajtmh.20-0815.
4. Martinelli AW, Ingle T, Newman J, Nadeem I, Jackson K, Lane ND, et al. COVID-19 and pneumothorax: a multicentre retrospective case series. *Eur Respir J.* 2020;56(5):2002697. doi: 10.1183/13993003.02697-2020.
5. Schnell J, Koryllos A, Lopez-Pastorini A, Lefering R, Stoelben E. Spontaneous pneumothorax. *Dtsch Arztebl Int.* 2017;114(44):739-744. doi: 10.3238/arztebl.2017.0739.
6. Wong A, Galiabovitch E, Bhagwat K. Management of primary spontaneous pneumothorax: a review. *ANZ J Surg.* 2019;89(4):303-308. doi: 10.1111/ans.14713.