CASE REPORT

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Spontaneous Pneumothorax Developing in the Late Period in Association with COVID-19 Infection: A Case Report

COVID-19 Enfeksiyonuna Bağlı Geç Dönemde Gelişen Spontan Pnömotoraks; Vaka Sunumu

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ABSTRACT
Several studies have been published concerning radiological findings in COVID-19 pneumonia. Spontaneous pneumothorax is one very rarely reported such finding. Spontaneous pneumothorax can develop in association with fibrotic changes occurring in the lungs, or with long-term positive-pressure intubation. In report we describe a case of a 27-year-old man who presented to the emergency department due to fever, who had no thoracic computed tomography (CT) findings at his first presentation, but who re-presented with spontaneous pneumothorax as the infection progressed.

ÖZET
COVID-19 pnömonisinde radyolojik bulgular ile ilgili birçok çalışma yayınlanmıştır. Bu bulgular içinde spontan pnömotoraks çok nadir bildirilenlerdendir. Spontan pnömotoraks, akciğerlerde meydana gelen fibrotik değişikliklere veya uzun süreli pozitif basınçlı entübasyona bağlı gelişebilir. Biz bu vaka sunumunda 27 yaşında erkek hastanın acil servise ateş şikâyeti ile başvurup, ilk başvurusunda toraks bilgisayarlı tomografi (Toraks BT) bulgusu olmayan, sonrasında enfeksiyonu progresyon gösterdikçe spontan pnömotoraks gelişerek tekrar başvuran bir olguyu sunduk.

Keywords:
Spontaneous pneumothorax
COVID-19
Complication

Anahtar Kelimeler:
Spontan pnömotoraks
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Komplikasyon

INTRODUCTION

The COVID-19 infection that emerged in the city of Wuhan in the Chinese province of Hubei in late 2019 has attracted worldwide attention due to the respiratory failure it causes (1). The essential feature of this infection is that it causes pneumonia. The formation of exudate with high protein density in the alveoli, infiltration of pneumocytes by multinuclear giant cells despite a high inflammatory response, and development of edema are events involved in the pathogenesis of COVID-19 pneumonia. Fibrosis subsequently develops secondary to this inflammatory response. Lung elasticity decreases in association with this process (2). Positive-pressure ventilation of these lungs exhibiting decreasing elasticity increases the risk of pneumothorax. Although COVID-19 infection appears with several radiological findings, spontaneous pneumothorax is one rarely seen complication of this infection. This case report discusses a case of spontaneous pneumothorax developing after approximately 20 days in association with the progression of COVID-19 pneumonia. Informed consent was obtained from the patient before the article.

CASE

A 27-year-old man initially presented to our emergency department with weakness and fever persisting for three days. He had no history of chronic disease, and was a non-smoker. The patient had no personal or family history of pneumothorax. No cough or respiratory distress was present at this presentation on 27.03.2020, and physical examination was normal. No pathology was detected at thoracic computed tomography (CT), and the viral nucleic acid real-time reverse transcriptase-polymerase chain reaction (RT-PCR) test performed for COVID-19 was negative. Since kidney and liver functions and electrolytes were normal at routine biochemistry tests, the patient was discharged and instructed to re-present if new symptoms occurred.

The patient re-presented on 04.04. 2020, when fever and shortness of breath were present. Minimal bilateral basal crepitant rales were present at physical examination. The patient's body mass index was 24,35. Oxygen saturation at room temperature was 95%, heartbeat 84/min, body temperature 37.90 C and arterial blood pressure 120/80. At thoracic CT, ground-glass opacity was present in the periphery of both lungs, and particularly in the lower lobes. This appearance was highly typical for COVID-19 infection (Figure 1).

A repeat RT-PCR test resulted positive. Blood test values were leukocytes 5.4 x103/uL (normal 3.8-10x103/uL), neutrophils 3.3x103/uL (normal 1.56-6.13x103/uL), lymphocytes 0.78 x103/uL (normal 1.18-3.74x103),

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platelet 300 x103 /uL (normal 150-400x103), and high sensitive C reactive protein 82 mg/L (N:0-3 mg/L). No pathological finding was present at blood gas analysis. Blood pH, and partial oxygen and partial carbon dioxide pressures were normal. The patient's general condition was good. Due to his high socio-cultural level and the fact he was capable of self-isolating at home, he was treated on an outpatient basis. Treatment included hydroxychloroquine, azithromycin, and paracetamol. The patient's contact details were noted, and he was discharged, with advice to return to the emergency department if shortness of breath occurred.

The patient re-presented with sudden onset shortness of breath and severe chest pain on 15.04.2020. He had no history of exposure to trauma capable of causing pneumothorax. No findings of paraseptal emphysema, cavitary lesion, or cystic bronchiectasis were also present at the previous thoracic CT examination. His body temperature was normal, but saturation was 88%. Arterial blood pressure was 100/70-mmHg and heart rate was 110/min. Auscultation at physical examination revealed decreased respiratory sounds on the left side, and crepitant rales in all zones on the right (Figure 2).

No pathology was present at other system examinations. Left-sided pneumothorax was detected at thoracic CT. Closed underwater drainage was applied, and the patient was transferred to the chest diseases hospital.

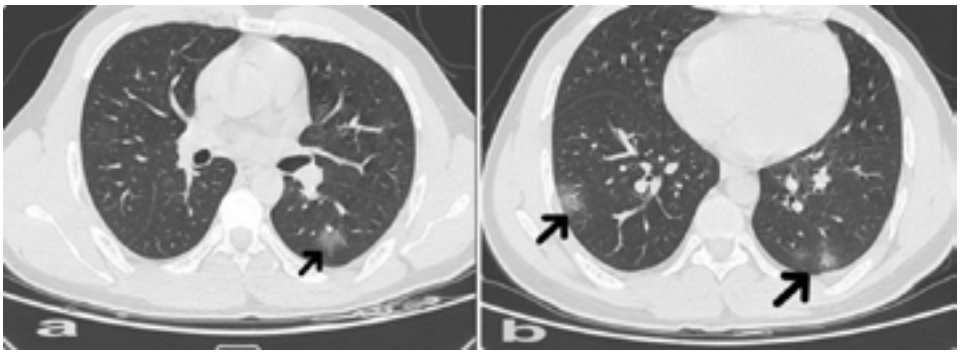

Figure 1: Chest computed tomography shows **a)** Infiltration in ground-glass opacity in the left lower lobe superior segment and **b)** Multifocal peripheral and subpleural ground-glass opacity in the bilateral lower lobe basal segments

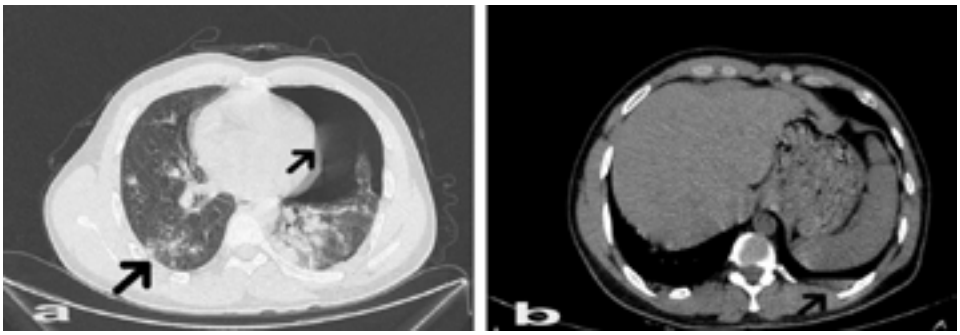

Figure 2: Chest computed tomography shows **a)** Pronounced air between the pleural leaves in the left lung (pneumothorax), compression collapse in the pulmonary parenchyma, and minimal pleural effusion in the basal region and **b)** Marked pleural effusion in the left lower lobe posterior basal segment

DISCUSSION

There may be several predisposing causes of spontaneous pneumothorax. Thin men, smokers, and individuals with chronic cough or chronic obstructive pulmonary disease have a greater disposition to pneumothorax development. Spontaneous pneumothorax essentially involves air leakage into the pleural space in association with development of alveolar rupture. Our patient had no underlying chronic disease or history of smoking for the development of spontaneous pneumothorax. One study involving tomographic findings of COVID-19 infection reported a 1% development rate for pneumothorax. In that study, Chen et al. attributed the development of pneumothorax to positive-pressure mechanical ventilation (3). Spontaneous pneumothorax development has been very rarely reported in COVID-19 infection (4-6). These cases have generally involved patients receiving positive-pressure respiratory support after intubation. The cause of the pneumothorax developed in the

patient may be microembolism in the pulmonary arterioles. Or, although there was no lung lesion in our patient's first application, it may have occurred due to the rupture of an existing fibrotic area. There are a number of very important points to be noted in the present case. The first is that our patient's symptoms at first presentation were mild, and progressed gradually. The negative PCR test at that time discouraged a diagnosis of COVID-19 infection. However, a PCR test performed consecutively over several days might have been diagnostic of COVID-19 infection, and treatment could thus have been started earlier. A second important point is our decision to treat on an outpatient basis despite the presence of tomographic findings at the second presentation. Our patient's generally good condition, his ability to self-isolate, and the likelihood that he would adhere to treatment led us to discharge him. Although such patients can be treated at home, they still require close follow-up. The third important point is our observation that COVID-19 pneumonia may lead to pneumothorax at subsequent periods. Although the cause of pneumothorax is not fully clear, it may have developed in association with an inflammatory process in the lung, or circulation disorder in the alveolar vessels. Severe cough can also cause pneumothorax in a lung with decreased elasticity.

CONCLUSION

In conclusion, pneumothorax may develop at later stages in COVID-19 pneumonia. Care must be taken in terms of pneumothorax development if the disease exhibits progression during the follow-up of these patients.

Conflict of Interest: Authors declare no conflict of interest.

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