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OLGU SUNUMU
CASE REPORT

Pneumomediastinum as a complication of COVID-19 disease: A case report

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ABSTRACT

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As the COVID-19 pandemic progresses, awareness of uncommon presentations of the disease increases. Such is the case with pneumomediastinum. Recent evidence has suggested that these can occur in the context of COVID-19 pneumonia, even in the absence of mechanical ventilation-related barotrauma. We present a patient with COVID-19 pneumonia complicated by pneumomediastinum.

Key words: *COVID-19; pneumomediastınum; dispnea; chest pain*

ÖZ

COVID-19 hastalığının bir komplikasyonu olarak pnömomediastinum: Bir olgu sunumu

COVID-19 salgınında vaka sayısı arttıkça, hastalığın nadir görülen komplikasyonları da ortaya çıkmaya başladı. Pnömomediastinum da bunlardan biridir. Son kanıtlar, bunların COVID-19 pnömonisi sonucunda mekanik ventilasyonla ilişkili barotravma olmasa bile meydana gelebileceğini gösterdi. Biz de COVID-19 enfeksiyonu sonrası pnömomediastinum gelişen bir olguyu sunuyoruz.

Anahtar kelimeler: *COVID-19; pnömomediastinum; dispne; göğüs ağrısı*

INTRODUCTION

Both pneumothorax and pneumomediastinum are known complications of mechanical ventilation due to intubation (1,2). Nonetheless, even without barotrauma involved, pneumothorax or pneumomediastinum, or more rarely both, can be present in the context of COVID-19 (3,4). Radiology stands as a cornerstone in the management of the COVID-19 pneumonia, especially in diagnosis and surveillance.

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Many parenchymal and extra-parenchymal abnormalities due to the novel coronavirus SARS-COV-2 have been described on CT. Parenchymal lesions are both alveolar and interstitial. The presentation on CT depends on the evolution in time of the pathology. Indeed, the most frequent and early manifestation is parenchymal ground glass opacities. The occurrence of spontaneous pneumomediastinum is an uncommon presentation. Herein, we report a case who had spontaneous pneumomediastinum related to COVID-19 pneumonia and discuss with the literature.

Case

A 26-year-old male patient was admitted to the emergency room with a 3-day history of dyspnea and chest pain. The patient had not reported any previous lung pathology. It was learned that he had a smoking history of 5 packs for years and had no additional disease. Breathing sounds were normal on physical examination. On presentation, his temperature was 37.4°C. Laboratory tests showed a C-reactive protein concentration of 106.3 mg/dL (normal range 0-5 mg/dL). Complete blood count showed elevated leukocytes (12450 cells per µL [normal range 3500-9500 cells per µL]), neutrophils (6900 cells per µL [2000-6500 cells per µL]), and eosinophil (690 cells per µL [100-500 cells per µL]), while the lymphocyte count (3000 cells per µL) and D-dimer value (210 ng/mL) were in the normal range. Other laboratory values were within the normal range. Arterial blood gas revealed with an SO_2 of 94% and PaO_2 80 mmHg. RT-PCR analysis of the sputum samples resulted positive for SARS-CoV-2. A chest CT scan showed multiple ground-glass opacities in the upper and lower lobes of both lungs (Figures 1a, 1b, 1c) In the mediastinum, the presence of free air around the vascular structures, trachea, main bronchi was observed. It was evaluated as pneumomediastinum. (Figures 2a, 2b, 2c). The patient had no history of trauma. Interventional intervention was not considered for the patient who was consulted with thoracic surgery. A conservative management was chosen because the pneumomediastinum was very small. The patient received favipiravir for COVID-19 pneumonia and

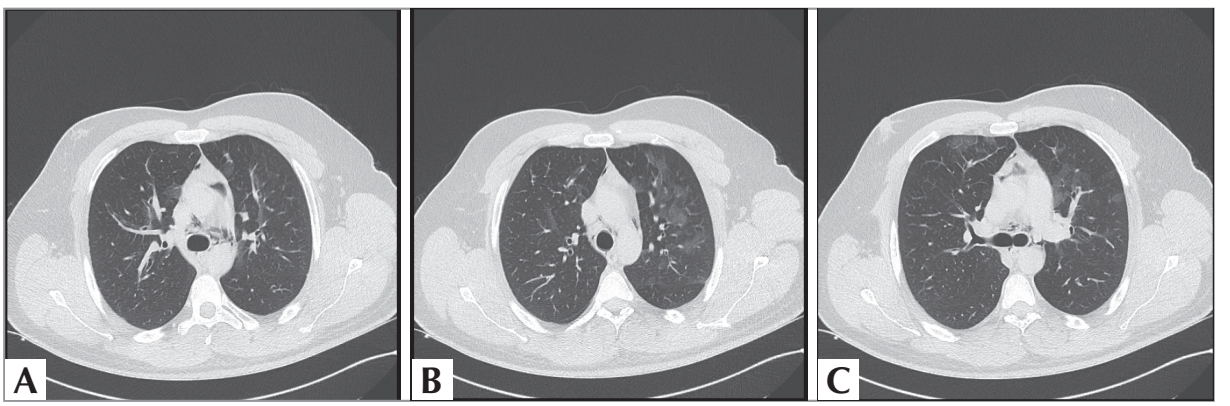

Figure 1. Ground glass areas of COVID-19 pneumonia in Thorax CT parenchyma sections.

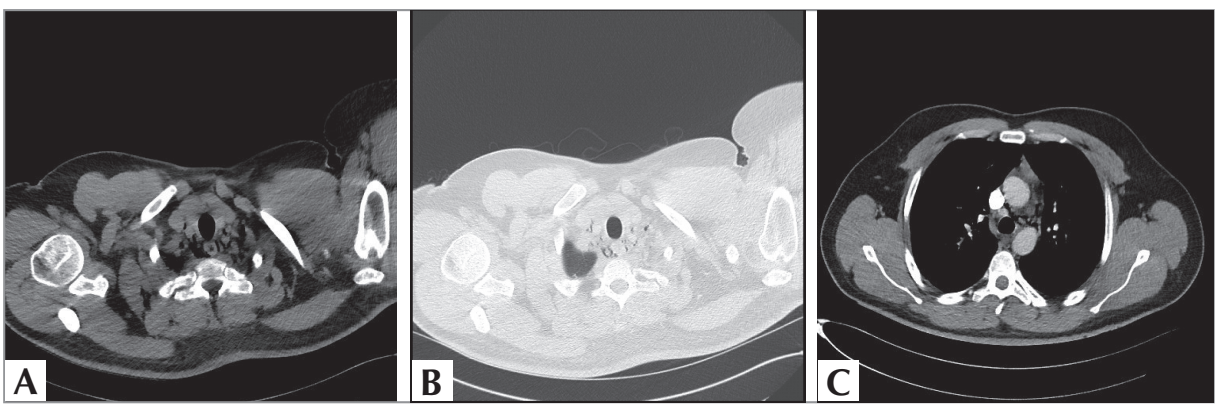

Figure 2. Pneumomedastinum areas in mediastinum and parenchyma sections of Thorax CT.

oxygen inhalation therapy for 5 days. The patient, whose dyspnea regressed during hospitalization, was discharged at his own request to come for control.

DISCUSSION

COVID-19 is a new disease caused by a coronavirus SARS-CoV-2. The viral particles can easily reach the pulmonary terminal structure, such as the alveolar wall and the interlobular septum, which cause an early alveolar exudation and a lymphocytic infiltration in the pulmonary interstitium. The most common clinical manifestations are fever, cough, myalgia or fatigue. Other symptoms are diarrhea, nausea, headache and hemoptysis (5). When pneumothorax and pneumomediastinum cases associated with COVID-19 have been examined in a review (6), of the pneumomediastinum cases, male sex is the most affected (66.6%; 4/6), and only 33.3% (2/6) present any associated comorbidities. In 83.3% (5/6), fever has been reported as the most frequent symptom, and one patient did not present any symptoms. Our patient dyspnea and chest pain applied with complaints.

On a chest CT, the most characteristic findings are ground-glass opacities, consolidated opacities, and septa thickening. The lessions are located in the posterior lower lobe and in the subpleural regions (5). Pleural effusion and lymphadenopathy have been rarely described. Spontaneous pneumomediastinum (SPM) is an uncommon presentation of COVID-19. SPM is defined as by the presence of air in the mediastinum without evident causes - traumatic, iatrogenic, hollow organ perforation, surgery, gas producing infections. Our patient had no trauma and intubation history. Therefore, the pathophysiology underlying spontaneous pneumomediastinum may be secondary to alveolar damage from the infection and a rupture of the alveolar wall due to increased pressure from pronounced coughing that occurs in response to the virus. Pneumomediastinum may be due to air leakage through the interstitial space due to increased pressure (7).

P. Dionísio et al. have found that precipitating factors for a spontaneous pneumomediastinum present in 86.7% of cases, including coughing bouts, excessive tobacco use, inhalation of other drugs and varnishes, strenuous physical activity and emesis. Their patients had at least one predisposing factor, such as active cigarette smoking, recent respiratory infection, asthma or interstitial lung disease (8). In our case, there was no underlying diseases. Also, he did not have a history of smoking or clear parenchymal patterns that suggest bullae or emphysema that could be predisposing factors for the development of pneumothorax. Viral pulmonary infections are rarely associated with SPM. It has been sparsely reported in influenza infections (9-11). The pathophysiology that have been discussed in those cases are the increasing of alveolar pressure through coughing and eventual alveolar damage. It has been shown that not only the influenza virus-related pneumomediastinum case, but also the new SARS-CoV-2 virus causes SPM (4,12-14). In a review, in 50% of the pneumomediastinum cases, the risk factors have not been reported. The evolution was favorable in 50% of the cases (6).

The mechanism underlying pneumomediastinum in our case cannot be explained. Our patient had no triggering or predisposing factors for spontaneous pneumomediastinum and showed very few symptoms. In addition, there were only a few localized parenchymal lesions on CT. He completely recovered during his follow-up and did not experience any complications. Spontaneous pneumomediastinum is mostly a benign, self-limiting disease. The treatment approach is based on rest, oxygen therapy, and analgesia. A preparatory or accelerating factor must be managed. The association of pneumomediastinum with COVID-19 does not require special treatment. However, it should be considered as a potential aggravating factor, especially in extensive pulmonary lesions.

In conclusion, spontaneous pneumomediastinum is not a common picture in COVID-19 infection and can potentially be an aggravating factor in the treatment of COVID-19 pneumonia. Indeed, the association of a widespread parenchymal lesion in the pneumomediastinum and CT indicates severe destruction of the alveolar membrane and thus potentially worsening clinical outcomes. On the other hand, when lung lesions are not large, as in our patient's case, the clinical course and prognosis seem better.

CONFLICT of INTEREST

The authors reported no conflict of interest related to this article.

AUTHORSHIP CONTRIBUTIONS

Concept/Design: BİD, CMA

Analysis/Interpretation: All of authors

Data Acquisition: BİD, CMA

Writing: BİD, CMA

Critical Revision: All of authors

Final Approval: BİD, CMA

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