

Pneumatocele as a Complication of COVID-19 Pneumonia on High-Flow Oxygen

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INTRODUCTION

A pulmonary pneumatocele is a thin-walled, air filled cavitory lesion seen in the lungs after an infection, or trauma.

^[1] The precise pathogenesis of pneumatocele is unclear but can be from air trapping in the distal airspace or alveolar damage of airways during infection, with the latter mechanism being most likely in COVID-19.^[2] The occurrence of pulmonary pneumatocele in patients with COVID 19 pneumonia in the setting of high positive pressure mechanical ventilation and or with the use of high dose corticosteroids have been reported.^[3] However, the development of pneumatocele in COVID-19 patients on high flow oxygen has rarely³ been reported. Hence, we present a case of a pneumatocele in a patient with COVID 19 pneumonia on a combination of non-invasive low positive pressure ventilation and pulsed doses of steroids.

Keywords: COVID 19; Pneumatocele; Steroids; High Flow Oxygen

CASE DESCRIPTION

A 64-year-old female with a past medical history of hypertension, prediabetes presented to the emergency room with shortness of breath, fever, and cough. On auscultations, bilateral basal lung crackles were noted. Oxygen saturation was 80% on room air, and arterial blood gas was significant for PO₂ of 55mmHg. Computed Tomography of Chest (CT), (**Figure 1**) showed diffuse bilateral, extensive ground glass opacities. The patient was diagnosed with COVID-19 pneumonia, following a positive COVID swab on reverse transcriptase-PCR. She was managed in the intensive care unit for hypoxemic respiratory failure with a low positive pressure ventilation using a High-Flow Nasal Cannula (HFNC) oxygen therapy (100% fraction of inspired air, FiO₂). She was treated with Remdesivir, Tocilizumab, Baricitinib, broad spectrum antibiotics (Cefepime and Vancomycin) and thromboembolism prophylaxis. Proning was also encouraged. Two weeks later, there was worsening hypoxia that prompted a follow-

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up contrast CT chest which ruled out pulmonary embolism. She was then given pulse doses of methylprednisolone along with diuretics. Subsequently, ten days later, CT chest was repeated which showed reduced reticular consolidations, ground glass opacities with a large thick-walled cavitary lesion in left lung apex and a smaller one in left lower lobe depicting a pneumatocele as shown in (Figure 2 and 3). Due to clinical improvement, the patient was discharged home with tapered steroids and home oxygen (two liter). At the four month follow up, she reported improved physical activity without the use of supplemental oxygen. CT Chest at this visit showed complete resolution of the left lower lobe pneumatocele while the left upper lobe one was unchanged in size.

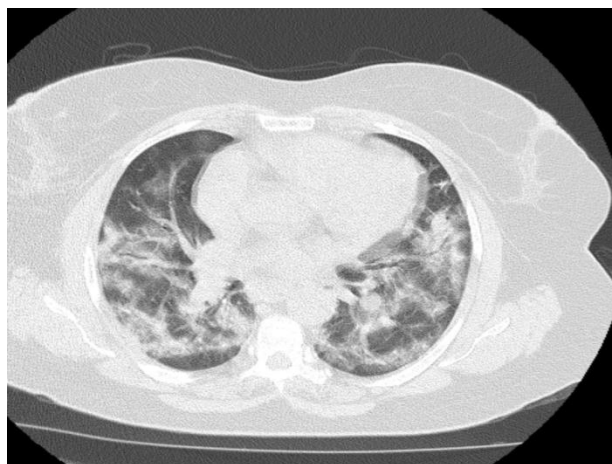


Figure 1: Computed tomographic (CT) scan of the chest confirming the bilateral subpleural Ground Glass Opacifications and septal thickening consistent with COVID-19 pneumonia.

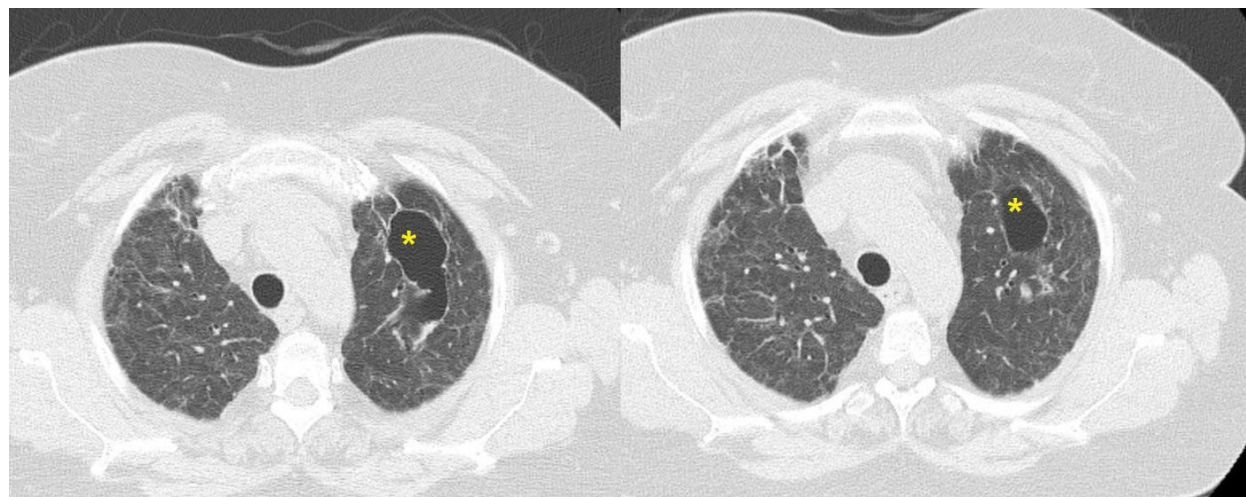


Figure 2: Computed tomographic (CT) scan of the chest confirming the new-onset thin-walled round radiolucent lesions consistent with pneumatocele (star).

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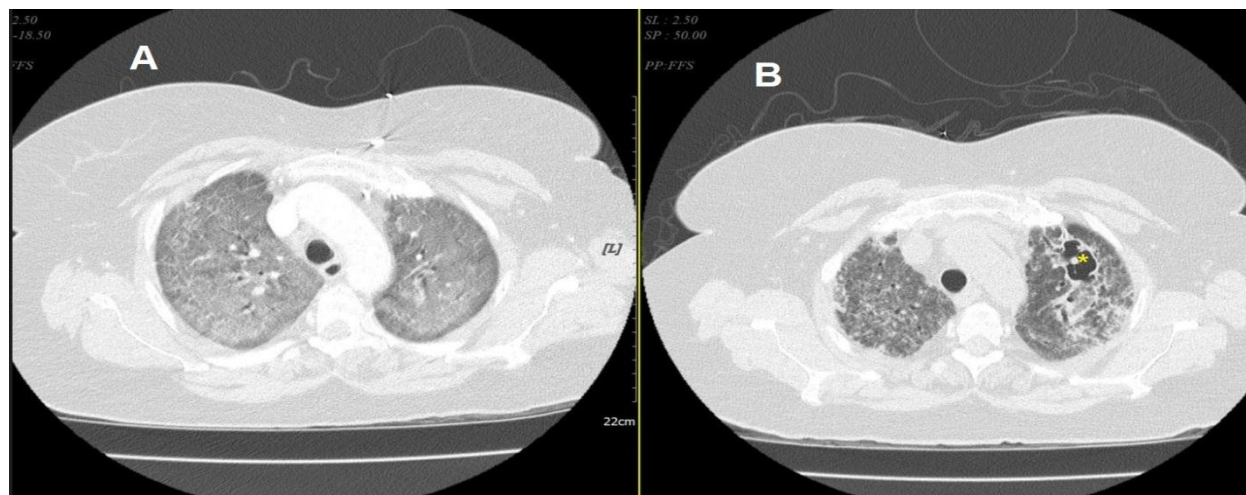


Figure 3: Comparison Computed tomographic (CT) scan of the chest confirming early COVID -19 Pneumonia without (A) and with (B) pneumatocele (star).

DISCUSSION

We presented a case of a pneumatocele in a patient with COVID 19 pneumonia on a combination of non-invasive low positive pressure ventilation and pulsed doses of steroids. The development of pulmonary pneumatoceles secondary to COVID-19 appears much less common, as compared with pneumothorax and pneumomediastinum and in patients treated with HFNC.^[1-3] In our patient, the development of pneumatocele can be attributed to the use of non-invasive low positive pressure ventilation and the cytokine cascade seen in COVID-19. It is arguable that the pulse doses of corticosteroid and diuresis that initially improved the respiratory symptoms, inadvertently prevented the pneumatocele worsening. While most pneumatoceles are asymptomatic, it is imperative to follow up these patients with chest imaging as increasing pneumatocele size requires prompt surgical attention.^[4] Others utilized a novel less invasive interventional bronchoscopy treatment with novel use of endobronchial valves in the treatment of pneumatocele.^[5] Currently, there are no established guidelines for a time-sensitive follow up for pneumatoceles. Screening algorithms need to be tailored to guide physicians to prevent complications associated with pneumatoceles.

REFERENCES

1. [Serebrisky D, Atlas AB, Boyer D. Pneumatocele. Medscape Apr 22, 2021. Accessed 2/15/2023.](#)
2. [Hamad A-MM, El-Saka HA. Post COVID-19 large pneumatocele: clinical and pathological perspectives. Interact Cardiovasc Thorac Surg 2021;\(33\): 322–324.](#)
3. [Sun R, Liu H, Wang X. Mediastinal emphysema, giant bulla, and pneumothorax developed during the course of COVID-19 pneumonia. Korean J Radiol. 2020;21\(5\):541-544.](#)

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4. McCann C, Shoeib M, Rashid MI, Kostoulas N. Pneumatocele formation following COVID-19 pneumonia. Is there a role for surgical intervention? Asian Cardiovascular and Thoracic Annals. 2022;30(4):493-497.
5. Bugge AS, Sundset A, Aaløkken TM, Jørgensen LH. Treatment of a pneumatocele in a COVID-19 patient with endobronchial valves. BMJ Case Rep 2022;15:e250409.