

PRIMARY SPONTANEOUS PNEUMOTHORAX IN A PATIENT OF MILD COVID-19 WITHOUT ANY RISK FACTORS: A CASE REPORT

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Abstract

A 36-year-old man with a recent history of lower respiratory tract infection of mild COVID-19 was treated at home without any comorbidities or addiction. He was sent to the emergency department after day 14 of COVID-19 infection. He complained of sudden onset right-sided chest pain with gradually increasing shortness of breath on exertion for three days. He received a diagnosis of primary spontaneous pneumothorax clinically and radiologically. An intercostal chest drain was inserted, which was removed after clinical recovery and radiologic re-expansion. He was discharged and followed up at the outpatient department; he was in good health and resumed his usual activities.

Keywords: COVID-19, Primary spontaneous pneumothorax, Pneumothorax

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Introduction

COVID-19 lower respiratory tract infection, caused by the coronavirus designated as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was first detected as a novel coronavirus that caused a cluster of pneumonia cases in Wuhan, a city in Hubei Province, China, in 2019.⁽¹⁾ Respiratory complications of COVID-19 during acute illness include Acute Respiratory Distress Syndrome (ARDS) and pulmonary thromboembolism. Secondary bacterial pneumonia exhibits an incidence of 8%, most commonly due to infections of *Klebsiella pneumoniae*, *Streptococcus pneumoniae*, *Staphylococcus aureus* and *Acinetobacter* spp. Long term sequelae of the respiratory system include lung fibrosis, shortness of breath, chest pain and cough etc.⁽²⁾ However, we could not find related reports of pneumothorax following a mild case of COVID-19. Hence, we are reporting our experience.

Primary spontaneous pneumothorax (PSP) is defined as the presence of air in the pleural space in the absence of an external event in an individual without any underlying lung disease. Secondary spontaneous pneumothorax (SSP) is defined as the presence of air in the pleural space among patients with underlying lung diseases such as chronic obstructive pulmonary disease, cystic fibrosis, lung malignancies etc. Pneumothorax including iatrogenic pneumothorax can also be traumatic due to penetrating or non-penetrating trauma. Rare case reports describe pneumothorax occurring in association with anorexia, exercise, illicit or immunosuppressant drugs or air travel and scuba diving.⁽³⁾

A Case Report

A 36-year-old man presented to the emergency department with complaints of sudden onset chest pain and shortness of breath on exertion for three days with marked discomfort while lying in the right lateral position. He had no comorbidities with no history of similar episodes, no history of smoking or drinking, or similar illness among family members. He received a diagnosis of mild COVID-19 lower respiratory tract infection 14 days back when on home isolation due to mild symptoms as per Government norms, and developed the complaints mentioned above during the isolation stay. He had been appropriately vaccinated with two doses of Covishield (Serum Institute, India). On examination, he was conscious, alert and cooperative but anxious. No pallor, icterus, cyanosis, clubbing or edema was noted. Jugular venous pressure was not engorged, and no lymph node was palpable. Vital signs included heart rate, 98 per minute, regular in rhythm, normal in volume, no radio-radial or radio-femoral delay, and all peripheral pulses were equally palpable. The respiratory rate was 24/min, regular and thoraco-abdominal, and no accessory muscles of respiration were active. Blood pressure was 130/80 mm Hg, and SpO₂ was 100% at room temperature.

Upon examination, the upper respiratory airway was normal, and no accessory muscles of respiration were active. On precordial examination, no obvious deformity or scar mark was seen, and the right hemidiaphragm chest expansion was reduced with increased fullness in the intercostal regions. On palpation,

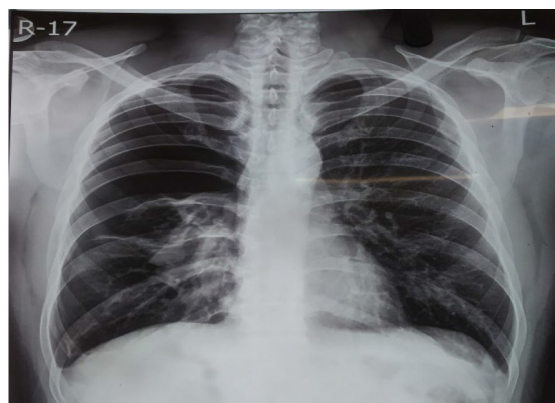


Figure 1. Chest X-ray on admission

the trachea was central, and the apex beat was located in the left fifth intercostal space 1.25 cm medial to the midclavicular line; vocal resonance was reduced on the right hemidiaphragm. On percussion, the right hemidiaphragm was hyper-resonant. On auscultation, normal vesicular breath sounds were heard over the left hemidiaphragm, with absent breath sounds and reduced vocal resonance over the right hemidiaphragm. Other systemic examinations were within normal limits. He received a clinical diagnosis of pneumothorax on the right side and underwent an emergency chest X-ray, confirming the diagnosis (**Figure 1**).

He was then put on a 24 French Inter-coastal chest drain on the right side with all aseptic precautions, and the procedure was uneventful; the water column inside the chest drain was moving along with respiration postprocedure (**Figure 2**). He was started on 2 L of O₂ per minute, IV ceftriaxone 1 gm twice daily for three

days and IV analgesics with paracetamol and tramadol thrice daily during the hospital stay. Repeat chest X-rays (**Figure 3**) and high-resolution computed tomography (HRCT) (**Figure 4**) chest were performed after a few hours, showing a right-sided chest drain in situ; the right lung was expanded with a few fibrotic strands in both lung fields.

Other investigations on admission detected hemoglobin 14.9 gm%, total leucocyte count (TLC) 7200/cu mm, platelet count of 1.51 lac/cu mm, activated partial thromboplastin time (APTT) 30.8 s, International Normalized Ratio (INR) 1.08, ferritin 166, D-dimer 293, creatinine 1 mg/dL, sodium 142 mEq/dL and potassium 4.2 mEq/dL. He improved with conservative management with optimal pain control and decreasing shortness of breath. He underwent chemical pleurodesis with betadine solution on day 2 of admission, and the procedure was uneventful; the inter-coastal chest drain

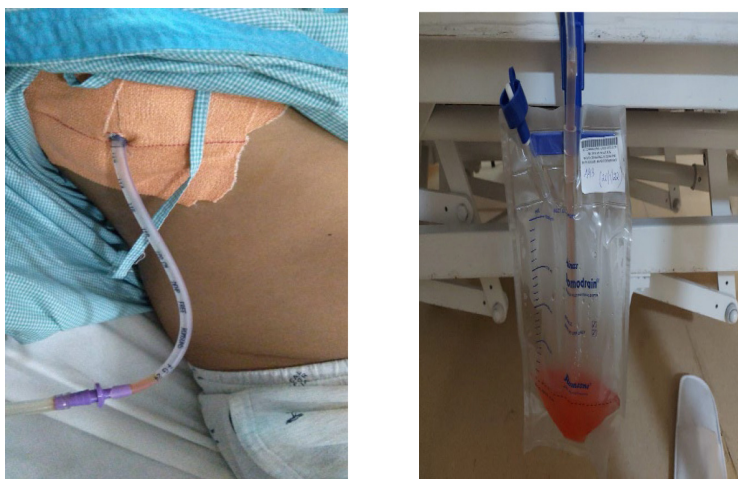


Figure 2. Chest drain site, moving water column of chest drain

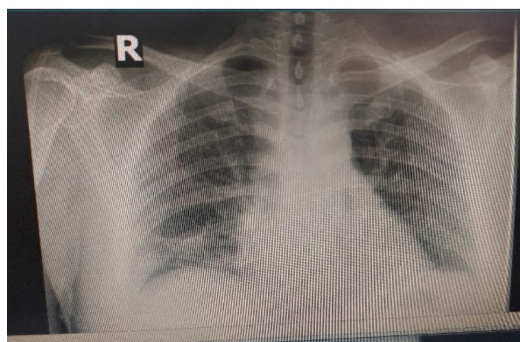


Figure 3. Repeat chest X-ray on admission day after inserting ICD

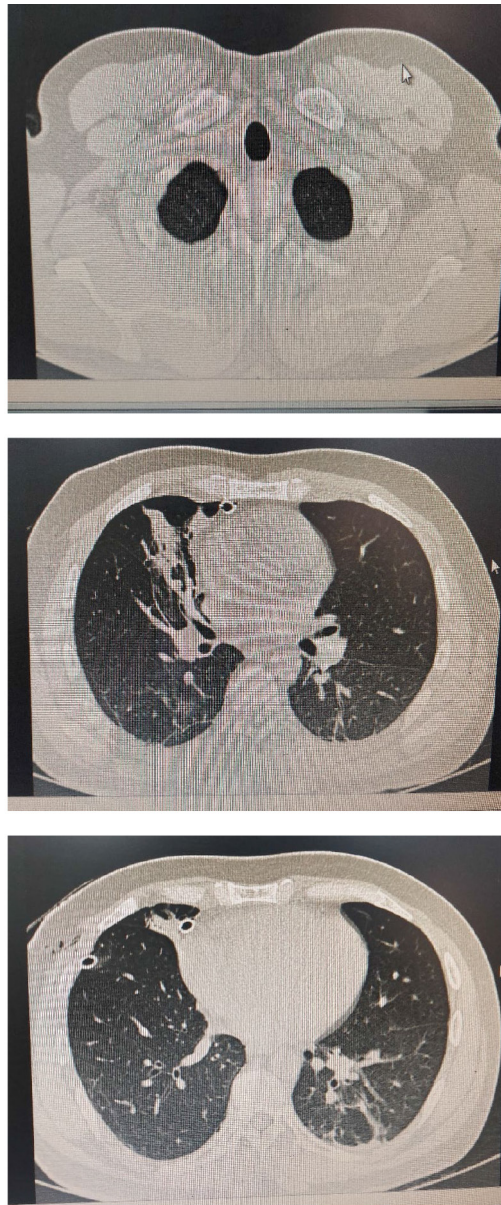


Figure 4. HRCT chest on the day of admission

was removed day 3 of admission, and he was discharged on day 4. On follow-up in the outpatient department ten days later, he was doing well and had resumed his usual daily activities.

Discussion

Most primary spontaneous pneumothorax cases are confirmed by chest X-ray, which can be used to assess the pneumothorax size. A pleural line with or without an air-fluid level can be seen in the chest X-ray but is not always possible as among patients with a small pneumothorax, emphysema, or poor exposure to the film. HRCT chest can be used to detect

patients with a small pneumothorax (less than 15% area of hemithorax). Therapeutic options include bed rest, oxygen supplementation, manual aspiration, chest tube drainage and thoracoscopic and surgical interventions.

Multiple studies have investigated COVID-19 and its association with the development of pneumothorax. In the setting of no history of any addiction and noncomorbid condition, mechanical ventilation appears to be the main risk factor for developing pneumothorax with COVID-19 pneumonia. The incidence of pneumothorax among mechanically ventilated patients is high, and is even higher among those with ARDS, ranging between 14 and 87%. It correlates directly to the

severity and duration of ARDS, barotrauma and volutrauma caused by mechanical ventilation with high incidence with high peak inspiratory pressures (>40 to 50 cm H₂O), high positive end-expiratory pressure, high tidal volumes and minute ventilation. Another precipitating reason could be persistent coughing, which increases the intrathoracic pressure and ruptures the already damaged subpleural alveoli due to COVID-19 in the alveolar space.⁽⁴⁾ Another reason for pneumothorax in COVID-19 could be developing a secondary bacterial infection, with one study estimating that bacterial infections could cause 11% of secondary spontaneous pneumothorax (%).⁽⁵⁾ However, for our patient, we did not have evidence of any of the complications mentioned above which could have led to the development of pneumothorax.

Primary spontaneous pneumothorax in a case of mild COVID-19 constitutes an unusual finding for those without any risk factors like underlying lung disease or significant coughing. Therefore, serious complications like PSP can occur in mild COVID-19. The patient was treated as per standard protocol for any pneumothorax. The decision on pleurodesis was made solely based on the clinical status of the patient and for long term management. Hence, a patient with mild COVID-19 can develop spontaneous pneumothorax as a severe complication, and it should

always be considered a differential diagnosis when the patient develops sudden onset chest pain and shortness of breath. Hence, we report a case of mild COVID-19, presenting acute chest pain and shortness of breath, which was diagnosed as spontaneous pneumothorax and treated conservatively.

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