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A Novel Case of Spontaneous Pneumomediastinum in COVID 19 Pneumonia

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Abstract: ***Spontaneous pneumomediastinum is a relatively rare condition, usually precipitated by conditions like chronic lung disease, asthma, mechanical ventilation and infections[1]. Furthermore, it is fairly uncommon in viral pneumonias. It has been reported in coronavirus pneumonia developing severe acute respiratory distress syndrome[2]. We present an unusual case of spontaneous pneumomediastinum in a case of COVID 19 pneumonia.***

Keywords: Pneumomediastinum, Pneumopericardium, COVID 19

1. Introduction

In the year 2020 COVID 19 was declared as a global pandemic by the World Health Organization. A lot is still unknown to us about the presentations, implications and complications of COVID 19. From the literature we have gathered thus far, it has been associated with numerous life threatening complications such as cerebrovascular accidents, venous thromboembolism, acute limb ischaemia and myocardial infarction[3]. Spontaneous pneumomediastinum is a commonly seen complication of mechanical ventilation, chronic lung disease and asthma[1]. However, in the setting of COVID 19 pneumonia, it is a relatively rare complication. It is in fact uncommonly associated with any viral pneumonia.

2. Case Presentation

A 53 - year - old male presented to our institution with fever and cough. He had no known history of COVID 19 exposure. He had a significant history of hypertension and diabetes, was taking medications for the same.

His physical examination revealed a low grade fever of 37.5°C, blood pressure was 152/80 mmHg and pulse was 85 BPM. His respiratory rate was 22 and his oxygen saturation was 98% on room air. Reverse transcription (RT) - PCR analysis of COVID - 19 was found to be positive. His laboratory investigations showed a white cell count of 11×10 ^{9} L (3.8–10.2) with a neutrophil count of 85 %.

Initial HRCT examination performed at the time of presentation revealed a CTSS of 3/40 (Fig.1). As per our institutional protocol, he was then quarantined at home with appropriate medical management. He presented 6 days later with high grade fever, worsening of cough and new onset shortness of breath. An HRCT examination was repeated which revealed an increase in the extent of pulmonary involvement with a CTSS of 30/40 (Fig.2). He was then hospitalized and given antiviral, antibacterial and corticosteroid treatments as well as non invasive supplemental oxygen. He showed a poor response to the medical management with persistence of cough, fever, shortness of breath as well as derangement of laboratory parameters. On day 20 of hospital admission, he developed a worsening in shortness of breath. A physical examination revealed crepitus around his neck and chest area. HRCT of the chest was repeated immediately and revealed severe progression in pulmonary involvement with CTSS of 39/40 (Fig.3). It also revealed a severe pneumomediastinum with pneumopericardium and extensive subcutaneous emphysema mainly extending superiorly in the thorax and into the neck without evidence of pneumothorax (Fig.3).

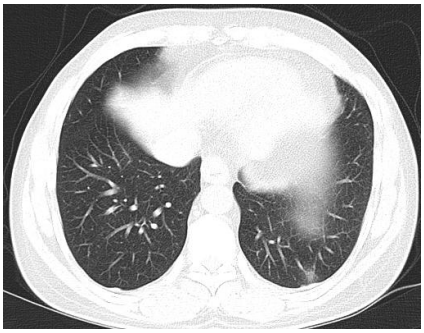

Figure 1: Initial HRCT Examination showing a CTSS of 3/40

Figure 2: HRCT CTSS of 30/40

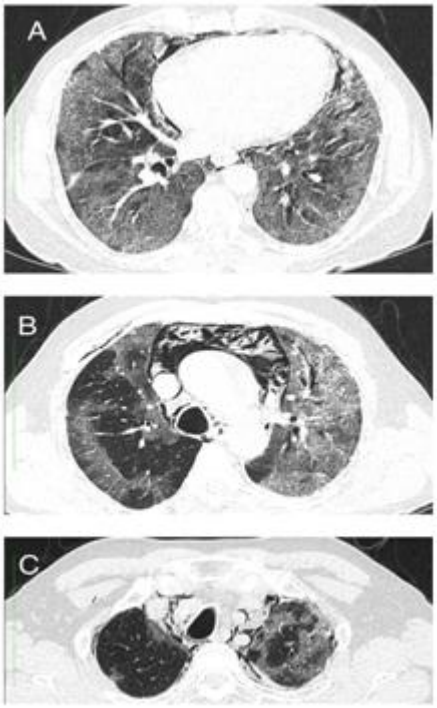

Figure 3: HRCT CTSS 39/40 with severe pneumomediastinum with pneumopericardium and extensive subcutaneous emphysema mainly extending superiorly in the thorax and into the neck

3. Conclusions

While we have seen numerous patients with COVID 19 pneumonia with pnemomediastinum developing as a sequelae to intubation and mechanical ventilation, this was a novel case in which the patient had no such prior history. Yet, with worsening of pulmonary involvement due to coronavirus pneumonia, he developed a severe spontaneous pneumomediastinum. This led us to question an alternate etiopathogenesis in his case.

Based on reviwed literature, it is possible that with worsening of pulmonary involvement in coronavirus pneumonia, there is rupture of damaged alveolar walls causing free air to track along the bronchoalveolar sheath and reach the mediastinum. This can then lead to pneumothorax, pneumopericardium, pneumomediastinum or even surgical emphysema[4]. It may be precipitated by any condition increasing the intra - thoracic pressure causing alveolar rupture such as valsalvamaneuovre or cough[5]. In our case we would like to give the hypothesis that the patient having prolonged and persistent cough with subsequent worsening could have been a precipitating factor.

Coronavirus pneumonia is commonly associated with a host of pulmonary complications such as ARDS, respiratory failure or embolism[6]. However, as spontaneous pneumomediastinum is a relatively rare entity it may not be anticipated and hence can often be missed. Physicians need to be careful in raising a suspicion of spontaneous pneumomediastinum and getting appropriate imaging done. A CT chest examination is the gold standard in it's diagnosis and should be performed in all cases where it is suspected. This will not only provide us with an accurate diagnosis of spontaneous pneumomediastinum but also will help us in distinguishing it from other complications like acute coronary syndromes or pulmonary embolisms which may present similarly clinically[7]. Development of spontaneous pneumomediastinum in coronavirus pneumonia canbe a poor prognostic indicator and while in certain cases it is self resolving and can be managed conservatively, in other instances it can be life threatening. In our case despite prompt imaging, diagnosis and treatment on our part this particular patient did not survive.

In conclusion we would like to say that a lot is still unknown about the coronavirus pneumonia and its complications. Hence, as clinicians and radiologists, we need to be vigilant in suspecting any or every complication whether common or uncommon in order to treat the patient optimally.

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