

## **PNEUMOTHORAX: A RARE COMPLICATION OF COVID-19 PNEUMONIA (A CASE REPORT)**

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### **ABSTRACT**

COVID-19 Pneumonia outbreak, started in China in December 2019 and spread world-wide. Patient usually presents with flu like or lower respiratory symptoms. At times, patients display rapid respiratory decline which is attributed to the progression of covid-19 pneumonia. Pulmonary embolism and extensive pneumonia are common complications. Pneumothorax may be a rare complication which has commonly been reported in ventilated patients and could be a life-threatening emergency. Early diagnosis and prompt management are detrimental for favorable outcome. We describe a 72 years old, male patient, admitted in covid-19 ward for COVID-19 pneumonia. Fever, dry cough and worsening shortness of breath were main complaints. Chest x-ray revealed signs of low-density consolidation in both mid and lower zones and pneumothorax on the left side. CRP, LDH, D. Dimer and serum Ferritin levels were raised. Covid-19 treatment started, chest drain inserted and patient was discharged after 15 days with full lung expansion.

**Keywords:** Covid-19 pneumonia-shortness of breath-complications-Pneumothorax.

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### **INTRODUCTION:**

COVID-19 pulmonary infection, caused by SARS-CoV-2, started in Wuhan (China) in December 2019 and spread globally like a wild fire. WHO declared it a global health emergency on 30<sup>th</sup> January, 2020.<sup>1-2</sup> Most of the patients present with fever, dry cough and shortness of breath of sudden onset but a few patients may show flu-like illness.<sup>3</sup> A significant number of patients usually, show progression of the disease and hypoxemia resulting into severe shortness of breath.

The gold standard for diagnosis is reverse transcription-PCR (RT-PCR) test, having inadequate sensitivity but high specificity. A large number of covid-19 PCR-negative patients require radiological intervention for decision making. HRCT-thorax exhibits

ground-glass opacity (GGO) and peripheral consolidation with or without reticular pattern.<sup>4</sup>

The disease may complicate with pleural effusion, thromboembolic phenomenon or myocardial involvement but pneumothorax could be a rare complication of COVID-19 pneumonia, leading to further worsening dyspnea.<sup>5</sup> Early detection and prompt management is essential for favorable out-come. Here we describe a case of corona virus pneumonia with worsening shortness of breath.

### **CASE REPORT:**

The patient is 72 years old, male, Muslim, five feet six inches tall, having 74Kg body weight, leading retired life and visited our OPD on wheel chair. He presented with history of fever, dry cough, shortness of breath, sore throat and body aches and pains. No history of smoking or any drug abuse at all. Patient is married, having six issues, two male, four female, all alive and healthy. His father was a case of ischemic heart disease. No history of Bronchial Asthma, DM, Hypertension or cancer in the family.

The patient complained of dry, irritating cough, precipitating spontaneously with several spells in 24 hours, for the last 05 days. Cough was relieved by cough mixtures to some extent but re-occurred again.

The patient was short of breath for the last 03 days, not improved at all by treatment from local practitioners and progressed gradually to mMRC-3 during the last three days. Dyspnea was aggravated by cough and not relieved by any inhaler or nebulization. It was not associated with tachycardia, palpitation, syncope attacks, orthopnea or swelling of feet.

Patient had left sided chest pain on the back-middle & front-upper aspect of the left chest for the last three days. Pain was dull, continuous, exaggerated with coughing and sneezing for which he had to take pain killers but temporary relief only. The patient complained of having high grade fever in the range of 101-102° F with chills for the last five days and he was on two tablets of Paracetamol 500mg, three times a day for the last three days.

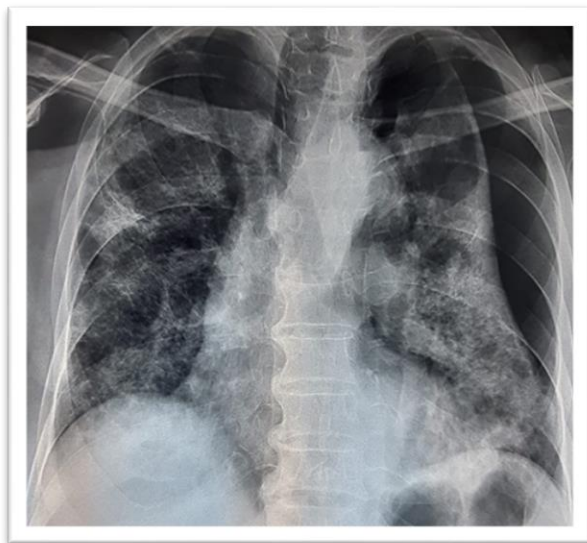
Physical examination showed pulse: 118/min, BP: 130/70 mmHg, Respiratory rate: 21/minute, He was febrile with Temp: 101.8°F and displayed 86% oxygen saturation at ambient room air.

Respiratory system findings included abdomino-thoracic respiration, elliptical chest. Chest movements and chest expansion decreased on the left side. Percussion note was hyper resonant on the left upper and lateral chest. Air entry was markedly reduced on the left side. Crackles and rhonchi found on both sides, predominantly on the left side in lower part, no pleural rub appreciated.

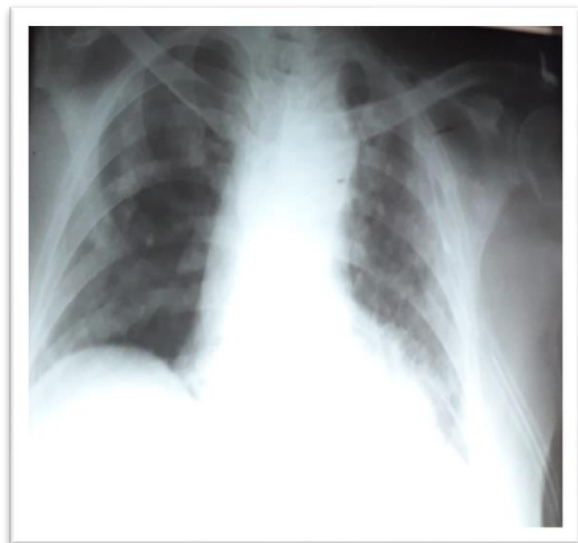
Chest x-ray PA view revealed more than 50% pneumothorax on the left side (Figure-1) in addition to low density haze, indicating ill-defined consolidation, predominantly in both lower and middle zones. Notable laboratory findings included an elevated C-reactive protein (CRP) of 230.9 mg/L (< 5.0 mg/L), LDH: 360 U/L (135-225U/L), D.Dimer:400ng/ml (< 200ng/ml) and serum ferritin level was 763.8 ng/ml (30-400 ng/ml). CBC manifested leukopenia and lymphocytopenia. Nasopharyngeal COVID-19 PCR was negative. Trans-thoracic ultrasonography exhibited the signs of covid-19 pneumonia (Figure-2) and after correlation with the current milieu of pandemic, a diagnosis of covid-19 pneumonia was made in departmental consensus.

The patient received COVID-19 pneumonia treatment in COVID-WARD, including azithromycin, ceftriaxone, Ivermectin, and Solumedrol along with anticoagulant, calcium & vitamin supplements, oxygen inhalation and paracetamol according to the local protocol. A chest drain was inserted for pneumothorax on the left side. A follow-up chest radiograph showed resolution of the pneumothorax & complete lung expansion (Figure-1). Patient improved, dyspnea settled, respiratory function restored and SpO<sub>2</sub> was 97% at room air. Chest tube was removed after 05 days and he was discharged in stable condition after 15 days with a follow-up plan.

**Figure-1,** Pre and post treatment radiological features.



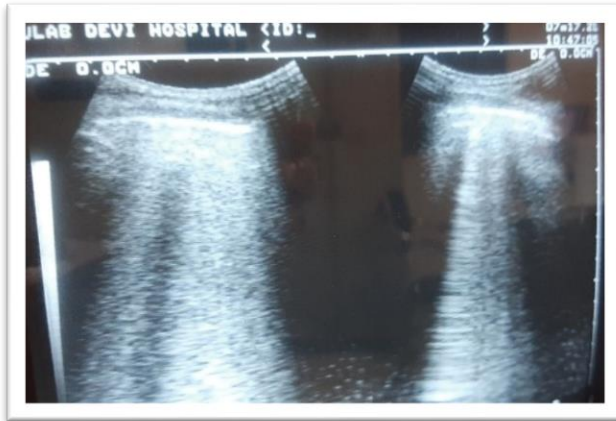
A



B

CXR: Chest X-ray, A: CXR at the time of presentation showing bilateral, multifocal ground glass shadowing with pneumothorax left. B: CXR after chest drain insertion showing complete lung expansion, chest drain is seen in situ. Pulmonary opacities are considerably resolved.

**Figure-2:** Trans-thoracic sonogram Ultrasound Features



X: B-lines in both lungs indicating interstitial pneumonia

## DISCUSSION:

The collection of air in pleural space is known as pneumothorax which is considered a medical emergency and requires life-saving surgical intervention. It can be spontaneous or due to trauma. Spontaneous pneumothorax is further classified into primary and secondary pneumothorax.<sup>6</sup> Pneumothorax which is without any underlying disease is known as primary while due to an underlying disease is called as secondary pneumothorax.<sup>7</sup>

Pneumothorax is not commonly encountered in covid-19 pulmonary disease. The first case was reported by Chen et al in 2020.<sup>8</sup> The number of reported patients is very sparse and majority of them show evidence of positive pressure ventilation but our patients developed pneumothorax on day third of the fever without any ventilation. Subsequent reports described pneumothorax with or without subcutaneous emphysema on the first day of diagnosis.<sup>9-11</sup>

Current literature conveys that the probability of pneumothorax happening in the setting of COVID-19 pneumonia is due to advanced alveolar damage, bronchiolar distortion and narrowing resulting in bullae formation. The dry irritating cough, increases the intrapulmonary pressure and can cause bullae rupture, precipitating pneumothorax.<sup>12</sup> Because pneumothorax can be a life-threatening emergency, timely detection

and prompt management are imperative for favorable result.

During an epidemic of highly contagious disease, with limited patient contact and examination, grave complications can be overlooked, leading to enhanced morbidity and mortality. The main complaint in our case was progressive shortness of breath which was considered due to deterioration of covid-19 disease. But old age with family history of ischemic heart disease and sudden shortness of breath creates a suspicion of cardiac involvement while ECG, Echocardiography & Trop-T test ruled out any cardiac pathology. The current literature states that pulmonary embolism is a common complication in covid-19 pneumonia, causing further deteriorating dyspnea.<sup>13</sup> No doubt, dyspnea was attributed to covid-19 infection but x-ray chest unfolded the mystery by showing pneumothorax on the left side in addition to the signs of covid-19 infection. It is therefore, suggested that if deterioration in disease status happens, pneumothorax should also be included in the differential diagnosis along with the possibility of progression of the covid-19 disease in addition to thrombo-embolism. Pneumothorax and thrombo-embolism, both conditions are life threatening and require prompt diagnosis and timely intervention. Pneumothorax can be diagnosed successfully by physical examination and chest x-ray while pulmonary embolism may be suspected by finding the signs of deep vein thrombosis in the lower limbs and performing a vascular ultrasound. According to the modern reports, point-of-care ultrasound has proven effective not only in diagnosing COVID-19 pneumonia, rather complications like pleural effusion, pneumothorax or thromboembolism can also be detected by this modality.<sup>14</sup>

This case highlights the importance of including this treatable complication in differential diagnosis, in patients with severe progressive respiratory compromise and also stresses upon that timely diagnosis and management can reduce COVID-19-associated morbidity and mortality. If patient is positive by covid-19 PCR, chest x-ray should be done to ascertain the cause of worsening dyspnea. Similarly, if there are constraints about exposure to radiation due to age or gender or seriousness of the patient does not allow mobilization, transthoracic point of care ultrasonography can be an excellent choice.

## CONCLUSION:

This case is reported because of its unique features of a pneumothorax in covid-19 infection in unventilated patient, masquerading with cardiac issue, pulmonary embolism and progression of corona virus pneumonia. Radiological modalities like chest x-ray & ultrasonography can easily unfold the mystery. Furthermore timely chest drain insertion is an excellent tool, capable of saving the lives in this scenario.

## ABBREVIATIONS:

COVID-19 : Novel Coronavirus-2019, SARS-CoV-2 : Severe acute respiratory syndrome corona virus-2, WHO : World Health Organization, RT-PCR : Reverse transcription polymerase chain reaction, PCR : Polymerase chain reaction, CXR : Chest X-Ray, LDH : Lactic Dehydrogenase, HRCT : High resolution computerized tomography, ECG : Electrocardiography, DM : Diabetes Mellitus, GGO : Ground glass opacity, OPD: Out-patient department, U/L : Unit per liter, °F: Degree Farenheite, mMRC : Modified medical research council.

## CONSENT:

A written informed consent was obtained from the patient for this publication.

## ETHICAL APPROVAL:

The study was approved by the Ethical Review Committee of Gulab Devi Teaching Hospital, Lahore, Pakistan. Reference No. GDH/84 Dated: July 28, 2020.

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## AUTHORS' CONTRIBUTION:

**ARQ:** Conception, manuscript writing, critical revision

**ZA:** manuscript writing, literature review, critical revision

**MI:** Data compilation, literature search, manuscript revision, correspondence

**MS:** Data collection, literature search, manuscript revision