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A Case Series

Uncommon Presentation of Covid Pneumonia- Clinicoradiological Characteristics

Abhisheka Kumar[1], Sarfaraz Ali[2]

[1]Associate Professor, Department of Pulmonary Medicine, Netaji Subhas Medical College and Hospital, Bihta

[2]Senior Resident, Department of Pulmonary Medicine, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India

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Corresponding author: Abhisheka Kumar
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Abstract:

Background: Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. Most common radiological features of the COVID-19 pneumonia: multifocal bilateral peripheral ground glass areas and patchy consolidations with subpleural location. Presence of pneumothorax/pneumomediastinum was rarely reported in literature. In COVID-19, patient may need positive pressure ventilatory support, undiagnosed pneumomediastinum and pneumothorax can be catastrophic for the patient.

Method: This was an observational longitudinal study done on patient who were diagnosed and admitted as COVID-19 on basis of rapid antigen test or RT-PCR at two centres between 1 july 2020 to 31st aug 2020.

Result: Total 198 patient were admitted with moderate to severe COVID pneumonia, 14 (7.0%) were included in our study those who have developed pneumothorax or pneumomediastinum. In 9(71.4%) patients, it was detected on 1st CT and in 4(28.5%) subject it was detected on follow up HRCT, and in those whom it was detected on follow up CT. Pneumomediastinum was present in 10(71%) patient, 12(85%) had pneumothorax, pneumopericardium 5(35%), subcutaneous emphysema in 3(21%), 8(57%) patients had both pneumothorax and pneumomediastinum.

Conclusion, this study suggests that some patients with COVID-19 are possibly at risk for pneumothorax/ pneumomediastinum, thereby providing a new insight in the management. Pneumothorax can occur in formerly healthy lungs, which is not necessarily related to the initial severity of COVID-19, without any obvious risk factor and can occur during any stage of the disease.

Keywords: COVID 19, Pneumothorax, Pneumomediastinum

Introduction

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.

Most common radiological features of the COVID-19 pneumonia: multifocal bilateral

peripheral ground glass areas and subsegmental patchy consolidations with subpleural location and predominant involvement of lower lung lobes and posterior segments. In this context, among the different patterns and findings described, the presence of pneumothorax/pneumomediastinum was rarely reported in literature [1-3]

Although pneumomediastinium is a benigh condition with good prognosis and need no special intervention in majority of patient but in this novel disease, pathogenesis is uncertain as most of these patients do not have any prior chronic respiratory condition.

After the diagnostic approach has excluded significant pathology, the pneumomediastinum treatment is directed towards symptom relief [4, 5]. However, in COVID-19, patient may need positive pressure ventilatory support in form of NIV and MV, undiagnosed pneumomediastinium and pnemothorax can be catastrophic for the patient when it occurs after some days when repeat scans are less likely ordered especially in developing country.

The aim of our study is to describe the clinico-radiological profile of patient who develop this condition to provide a framework for future studies

Material and Methods

This was an observational longitudinal study done on patient who were diagnosed and admitted as COVID-19 on basis of rapid antigen test or RT-PCR at two covid dedicated centres between 1 july 2020 to 31st aug 2020.

Every patient underwent HRCT scan of thorax after admission and subsequently followed up with chest x-ray and if needed repeat HRCT. Those who developed pneumomediastinium or pneumothorax were included in our study

Result

In study period, total 198 patient were admitted with moderate to severe COVID pneumonia, 14 (7.0%) were included in our study those who have developed pneumothorax or pneumomediastinium.

Age group 15-40 includes 7 patients and above 40 includes 7 patients. CTSS score was severe (16-25) in 12, moderate (9-15) in 2 subjects.

In 9(71.4%) patient (table 1), it was detected on 1st CT scan and in 4(28.5%) subject it was detected on follow up CT, and in those whom it was detected on follow up CT, minimium duration between scan was 4 days to up to 17days.

Majority (78.5%) of patient were on non-re-breathing mask with oxygen reservoir and only 3 on bipap before detection of study condition.

Pneumomediastinium (table 2) was present in 10(71%) patient, 12(85%) had pneumothorax (fig 1), pneumopericardium 5(35%), subcutaneous emphysema in 3(21%), 8(57%) patients had both pneumothorax and pneumomediastinium. All patients recovered with conservative management only.

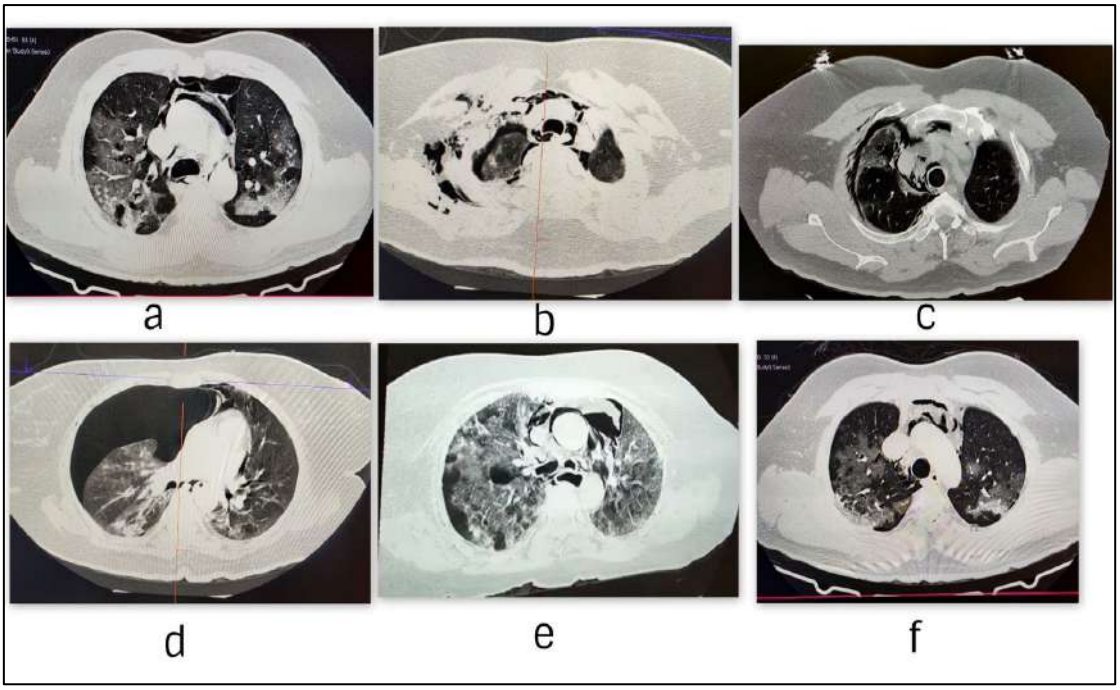

Fig. 1. Baseline CT features showing consolidation, GGO predominantly in bilateraland perepheral lung along with a) pneumopericardium; b) pneumothorax along with pnemomediastinium and subcutaneous emphysema; c) pneumothorax with pneumomediastinium; d) pneumothorax only; e) pneumomediastinium ; f) pneumomediastinium

Discussion

To our knowledge, there are only handful of case reports which has been published linking COVID-19 and spontaneous pneumothorax, none of them are from indian population. Incidence of pneumothorax or pneumomediastinium in our study is 7% which is higher than

What has been recently reported in the literature [6, 7]

Zantah et al [8] reported 6(0.66%) cases of pneumothorax, 4 having history of mechanical ventilation as risk factor, all managed with chest tube insertion with rapid resolution of pneumothorax but overall poor prognosis, only two of them survived, compare to that, in our study we had 14 (7%) cases of pneumothorax in previously healthy individual with no risk factor of pneumothorax. All of them were managed with high flow oxygen with rapid resolution and overall good prognosis.

Matthijs l. Janssen et all [9] reported 3 cases of spontaneous pneumothorax from Netherland in patients with COVID-19. They found that pneumothorax can occur during different phases of disease, in patients without a pulmonary disease history and is not necessarily associated to positive pressure ventilation or severity of COVID-19, similar to finding in our study in which 4 cases of pneumothorax was detected on subsequent CT scan.

Changyu zhou et all [1] reported a case of spontaneous pneumomediastinium with subcutaneous emphysema in a 38yrs old male COVID-19 patient.

Cm Chu et all [10] have reported 24 patients of pneumomediastinium in 123 confirmed cases of sars,13 had subcutaneous emphysema and 11 developed pneumomediastinium with or without pneumothorax. Romano et all [11] have presented 2 cases of pneumomediastinium in COVID-19 patients .1st patient is 30 yrs old male with mild COVID pneumonia who had pneumomediastinium with subcutaneous emphysema. Second patient was 65 yrs male with severe COVID

pneumonia who presented in emergency department with low oxygen saturation, both of these patients responded to conservative management.

The exact cause leading to pneumothorax/pneumomediastinium in COVID-19 is not known so far, the proposed mechanism is thought to be related to the structural changes that occur in the lung parenchyma. These include cystic and fibrotic changes leading to alveolar tears. In addition to the increase in intrathoracic pressure resulting from prolonged coughing and/or mechanical ventilation [1, 2, 12, 13, 14]

In conclusion, the presented cases suggest that some patients with COVID-19 are possibly at risk for pneumothorax/ pneumomediastinium, providing a new insight in COVID-19 care. Pneumothorax can occur in formerly healthy lungs, which is not necessarily related to the initial severity of disease, without any obvious risk factor, and can occur during any stage of the disease. This demonstrates that the possibility of a pneumothorax should be kept in mind in patients with or recovering from COVID-19 disease with progressive dyspnea, and follow-up ct should be done. Further research is required to assess these patients' underlying mechanisms responsible for pneumothorax. We suggest that, as conservative management is sufficient in most cases, invasive intervention can be withheld unless the patient is on a mechanical ventilator or clinically unstable.

Abbreviation

HRCT- High-resolution computed tomography, CT- Computed tomography

NIV-non-invasive ventilation, MV-mechanical ventilation, CTSS-chest CT severity score

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