



COVID-19 AND PNEUMOTHORAX: A CASE SERIES

Medicine

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ABSTRACT

Covid19 causing variant of pulmonary symptoms and complications, in this case series we reported about the observations made in 9 cases of COVID 19 associated with pneumothorax. Pneumothorax was predominantly seen in severe pneumonia patients with the mean age of 44.613.6 years, with male preponderance. Pneumothorax presented in different scenarios, 3 (33.3%) admitted with presentation of pneumothorax, 4 (44.4%) developed during the course of the illness and 2 (22.2%) after mechanical ventilation. The mean duration of hospital stays prolonged in all cases. Out of 9 cases, 3 were managed conservatively and 6 by intercostal chest tube drainage. Mortality was observed to be 55.5% among 9 patients. Pneumothorax acts as an independent risk factor for severe covid19 infection in worsening oxygen status, prolonged hospital stay leading to morbid outcomes. So early diagnosis, appropriate treatment modality and optimized ventilatory strategies can limit the morbidity and mortality in COVID19 patients with pneumothorax.

KEYWORDS

COVID-19, Pneumothorax, mechanical ventilator complication

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a highly infectious disease caused by severe acute respiratory syndrome virus coronavirus 2 (SARS-CoV-2). Diagnosis of this condition is usually done by a RT-PCR done from a nasopharyngeal swab¹, though imaging with computerized tomography (CT) not recommended in routine but it is used for screening in COVID-19 suspected cases on either initial evaluation and follow-up. Known radiologic hallmarks of COVID-19 pneumonia on CT are bilateral extensive ground-glass opacification (GGO) with a peripheral or posterior distribution, mainly involving the lower lobes. Uncommon features can be listed as pleural and pericardial effusion, lymphadenopathy, cavitation, CT halo sign, and pneumothorax². Pneumothorax is defined as air in pleural space, commonly seen in patients with cases with infective aetiologies like Influenza, Herpes simplex virus and Pneumocystis pneumonia, and added to this list is the present pandemic of COVID 19³, which is a highly infectious disease and is found to have many systemic complications alongside. Hereby we are presenting 9 cases of pneumothorax in association with COVID 19 infection.

Case Summaries:

Here, the patients who were enrolled for the cases series are considered under 3 categories depending upon the timing of onset of pneumothorax. (Table 1)

Category 1: On Presentation With Both Covid And Pneumothorax:

Of the total 9 patients 3 cases presented with progressive dyspnea and severe pneumonia with pneumothorax on CT all the 3 were young and had no comorbidities. In the initial two cases, was managed by an Intercostal drainage (ICD) but both the patient's condition worsened and was put on ventilatory support, later they succumbed to death. The 3rd case the patient was managed conservatively (Fig. 1) and discharged successfully.

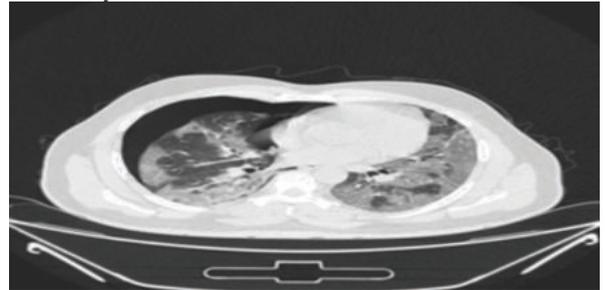


Fig.1 47 years old male presented with progressive dyspnea for 2 weeks, his HRCT chest shows diffuse ground glass opacity in bilateral lung fields with right side pneumothorax who managed conservatively.

S.NO	Age	Sex	Comorbid conditions	Smoking H/o	Hospital days	Days from the onset of symptoms to Pneumothorax	Initial CT scoring	Mode of oxygenation prior to pneumothorax	Prior /after intubation	Management	Ventilator Status	Side of Pneumothorax	Outcome
I. On Presentation with both COVID and Pneumothorax:													
A	29	M	-	-	18	13	21/25	NRBM, INTERMITTENT NIV	Prior	Chest tube drainage	Intubated PC-AC mode	Left	Deceased
B	27	M	-	-	10	16	22/25	NRBM, INTERMITTENT NIV	Prior	Chest tube drainage	Intubated PC-AC mode	Bilateral	Deceased
C	47	M	-	-	15	15	19/25	NRBM	NA	Conservatively managed	Not intubated	Right	Survived

2. During the course of hospital stay worsen to have Pneumothorax													
A	31	M	-	-	43	34	22/25	NRBM, INTERMITTENT NIV	Prior	Chest tube drainage	Intubated PC-AC mode	Right	Deceased
B	50	M	-	-	31	31	20/25	NRBM, INTERMITTENT NIV	NA	Chest tube drainage	Not intubated	Left	Survived
C	58	M	-	-	10	34	18/25	NRBM	NA	Conservatively managed	Not intubated	Left	Survived
D	67	M	T2DM	-	24	24	24/25	NRBM	NA	Conservatively managed	Not intubated	Left	Survived
3. Patients who developed Pneumothorax as a complication of mechanical ventilation in severe COVID													
A	49	F	-	-	19	14	19/25	NRBM, INTERMITTENT NIV	After	Chest tube drainage	Intubated PC-AC mode	Right	Deceased
B	43	F	-	-	36	18	15/25	NRBM, INTERMITTENT NIV	After	Chest tube drainage	Intubated PC-AC mode	Left	Deceased

Category 2: During The Course Of Hospital Stay Worsen To Have Pneumothorax

Here the second category 4 cases with severe pneumonia who got worsened to have pneumothorax after hospitalization. Among the 4 first case was comparatively young, developed pneumothorax and his clinical condition got worsened hence he was managed with ICD (Fig.2A &2B) and mechanical ventilator but he succumbed to death after 13 days. In other 3 cases the clinical condition got worsened after pneumothorax but 2 were managed conservatively, 1 by ICD and discharged successfully.

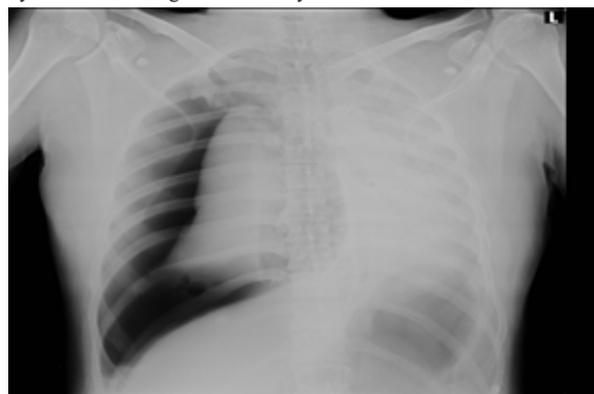


Fig.2 A. Chest X ray of 31 years old right- side pneumothorax (34th day of hospital stay).



Fig.2 B. Chest X ray showing of the same patient after intercostal drainage (ICD) placement, right expanded lung with diffuse patchy infiltrate in bilateral lung fields with ICD in situ.

Category 3: Patients Who Developed Pneumothorax As A

Complication Of Mechanical Ventilation In Severe Covid

Here in this category both the patients were female and had severe pneumonia in their initial CT, even with constant medication with standard protocols, the condition further got worsened for which invasive ventilatory management is done, even on ventilatory support patient's oxygenation did not improve. On spot chest X ray revealed pneumothorax, so tube thoracotomy (ICD) was done to corresponding side. Unfortunately, on the following days the clinical status of both the patient continued to worsen and developed multiorgan failure and died despite providing resuscitative measures.

DISCUSSION:

COVID-19 affected the entire globe and the disease burden mainly depended on the susceptible age group; mortality rate is highly variable and it mainly depends on factors like on the demographical profile, economic status, and health care infra- structure [4].

Demographic Indicators:

Demographically, the mean age of the patients was observed to be 44.613.6 years, and there was a male preponderance as per the observations. This observation was in consonance with various other studies done world over (3,4).

Clinical Presentation:

All the cases presented with progressive dyspnea and symptoms in consonance with COVID 19. The mean CT-SS 25point score was found to be 202.6. The mean duration for onset of pneumothorax was found to be 22.18.8 days from the onset of symptoms. Here in this series of cases of 3 (33.3%) out of 9 cases got admitted to the hospital with pre-existing pneumonia,4(44.4%) developed during the course of stay and 2 (22.2%) developed after mechanical ventilation. In these cases, there are myriad of reasons for the occurrence of spontaneous pneumothorax, like pre-existing lung pathologies or rupture of alveoli or cysts due to vigorous cough in cases of COVID19 and ventilatory strategies as the considerations made in the other supporting literature [3]. Of the 9 patients only one patient developed bilateral pneumothorax, 2 developed pneumothoraxes on the right side and rest all developed pneumothorax on the left side.

Management:

Patient was given appropriate treatment as per guidelines, for pneumothorax 3 patients out of 9 were conservatively managed. 6 patients were treated with NIV as clinical worsened out which 4 developed pneumothoraxes during the course and the other 2 were put on mechanical ventilation following which they developed pneumothorax later. All the 6 patients were managed with chest tube drainage. The mean duration of hospital stay was observed to be 22.911.6 days.

Mortality Statistics Among The Patients:

Of the total 9 cases only 4 cases survived while rest of the 5 were deceased. Thus, the overall COVID mortality observed in the present

series was 55.5%. of total 9 patients observed 5 patients were put on invasive modalities, 4 were put on mechanical ventilation and one patient was not mechanically ventilated but underwent an ICT drainage. Mortality was 100% in patients who were mechanically ventilated and the survival was 100% in patients who were managed conservatively by high pressure oxygen and NIV. But the main problem lies in being decisive upon the timing of the onset of complications which still stays inconclusive as supported by literature (3,4,5).

Limitations:

The major limitation of the study is that, it was an observational retrospective study done among a smaller sample size so a statistically significant affirmations cannot be made which proves the causality between pneumothorax, COVID 19 and the effects of various modalities of interventions, for which we might need larger studies.

CONCLUSION:

Pneumothorax acts as an independent risk factor for severe covid19 infection in worsening oxygen status, prolonged hospital stay leading to morbid outcomes. So early diagnosis, planning an appropriate treatment modality and optimized ventilatory strategies can limit the morbidity and mortality in COVID19 patients with pneumothorax.

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