

Incidence of pneumothorax/pneumomediastinum in non-intubated COVID-19 patients between the first and the second Italian pandemic wave

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Background

Pneumothorax (PNX) and pneumomediastinum (PMD) have been frequently observed in mechanically ventilated patients with coronavirus disease 2019 (COVID-19)-related acute respiratory distress syndrome (ARDS), with a reported rate up to 24%.

Methods

We identified all patients with pneumothorax and/or pneumomediastinum documented at chest X-ray or computed tomography between March 1st, 2020 and June 1st, 2020 and between October 1st, 2020 and January 1st, 2021. Patients were included in the analysis if not invasively ventilated before PNX/PMD diagnosis.

Results

Fourteen non-intubated patients with radiologically proven PNX/PMD were identified: one patient during the first wave and 13 during the second wave ($p = 0.005$ when using all patients at denominator and $p < 0.001$ when using only patients who underwent CT scan at denominator). Specifically, eight patients had PMD, two PNX. At the time of PNX/PMD development, eight patients were on CPAP, whereas six patients were on supplemental oxygen therapy only. All but the patient of the first wave were on steroid therapy. Median time from symptoms onset to PNX/PMD was 18 (17–24.5) days; median time from corticosteroid start to PNX/PMD was 15 (13–17) days. After PNX/PMD onset, four (29%) patients were admitted to ICU and seven (50%) patients died.

Table 1. Patients' characteristics and treatment details.

Variable	First wave (N=1)	Second wave (N = 13)
Age, years	75	72 (65 – 76)
Male sex	Male	12 (92.3)
CPAP	Yes	7 (53.8)
Steroid therapy	No	13 (100)
- Dexamethasone		- 12 (92.3)
- Prednisone		- 1 (7.7)
LMWH (4000 IU enoxaparin)	Yes	13 (100)
Antibiotic therapy	Yes	9 (69.2)
HCQ (400 mg daily)	Yes	0 (0.0)
Biologics	No	5 (38.5)
- Tocilizumab (400 mg)		- 1 (7.7)
- Anakinra (10 mg/kg)		- 4 (30.8)
Comorbidities	Yes:	3 (23.1)
- COPD	- Yes	- 1 (7.7)
- ILD	- No	- 0 (0.0)
- DM	- No	- 1 (7.7)
- Cancer	- No	- 2 (13.4)

Continuous variables are presented as median and interquartile range, while categorical variables are presented as number and percentages. CPAP: continuous positive airway pressure; COPD: chronic obstructive pulmonary disease; DM: type-2 diabetes mellitus; HCQ: hydroxychloroquine; ILD: interstitial lung disease; IU: international units; LMWH: low molecular weight heparin

Conclusions

The rate of PNX/PMD in non-intubated COVID-19 was significantly higher in the second pandemic wave as compared with the first pandemic wave.

As the only difference in treatment between the two waves was dexamethasone administration and hydroxychloroquine avoidance, it could be hypothesized that dexamethasone might have induced lung frailty and increased the risk of PNX/PMD, as already suggested in patients with interstitial inflammatory lung diseases.

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