

## **COVID19 with Necrotising Pneumonia - An Unusual Complication with Risk of Pyo-Pneumothorax in COVID Patient**

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### **Case History**

A 47 y.o. female known case of bronchial asthma/Hypertension presented to ED with C/o: Cough, fever and breathing difficulty since 4 days. She took antibiotics but no improvement. No h/o recent travel or contacts. On arrival, patient was in severe respiratory distress, tachycardiac, tachypnoeic and desaturating to 50% even while on non-rebreather mask at 15 L/min and hence she was intubated. Her Vitals were as follows: In ER:BP: 170/91, Pulse: 137 regular tachycardia, Respiratory rate: 36/min, Temperature: 37.9°C (100.2 °F), SpO<sub>2</sub>: 50% on 15 LPM by NRM.

Chest auscultation revealed - bilateral extensive crepitations in bilateral lung zones.

Patient was admitted as a case of severe COVID-19 pneumonia. she was extubated and re-intubated on and tracheostomised. She underwent continuous renal replacement therapy (CRRT) while in ICU. She was assessed by RT team and decannulated on 25/06/2020.

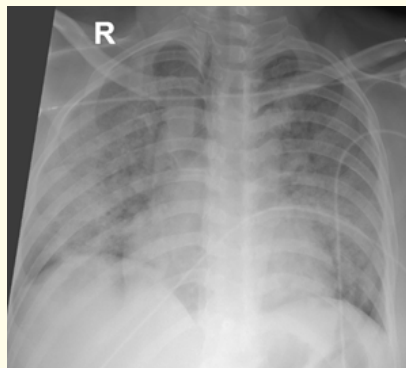
Novel coronavirus RNA PCR swab was positive on 6 and 11 May 20.

CTPA was done for high dimer level and ruled out PE and showed consolidations with cavitary changes in right upper lobe and left lower lobe.

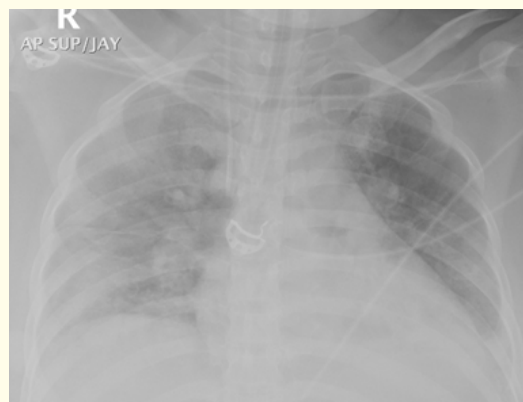
Patient was treated with full anti COVID-19 treatment, she received:

- Hydroxychloroquine 200 mg bd for 3 days -Discontinued due to prolonged QT.
- Kaletra 2 tab bd- for 5 days -Discontinued due to prolonged QT.
- Methylprednisolone 1 mg/kg body weight for 1 week.
- Plasma exchange - on 7/5/2020.

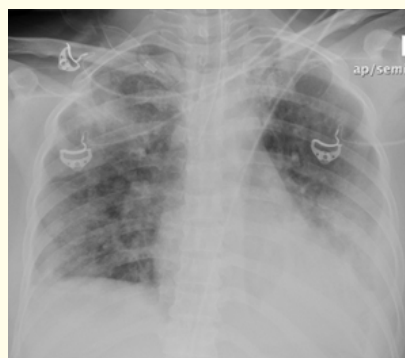
Linezolid and cefuroxime were also given in view of MRSA and Enterococcus cloaca in respiratory culture. CT Pulmonary angiography CTPA was done for high dimer level and ruled out PE and showed consolidations with cavitary changes in right upper lobe and left lower lobe.



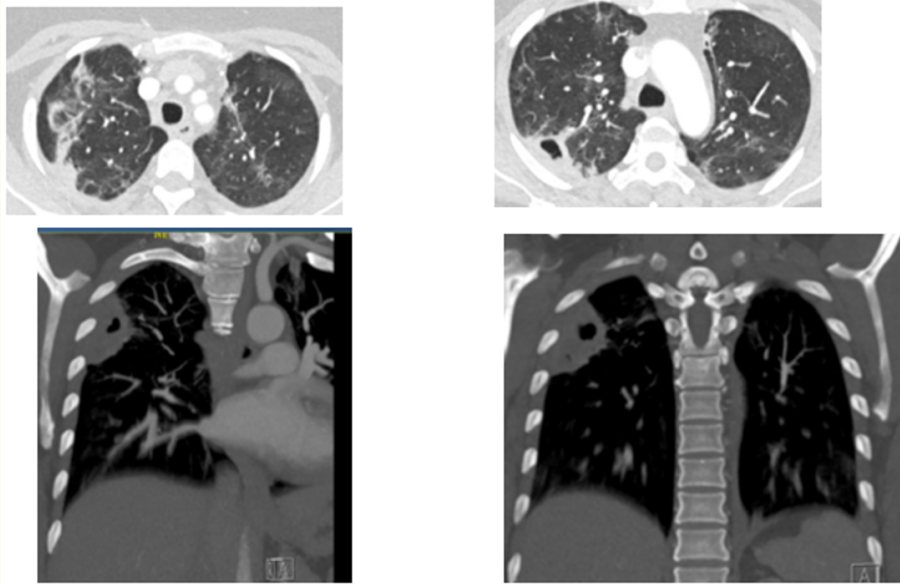
**Figure 1:** CXR 6 May 2020: Findings: Patchy areas of consolidation involving bilateral lung fields, with relative sparing of both lung apex. No pleural effusion or pneumothorax. No hilar lymphadenopathy. Impression: The correlation with the patient's clinical suspicion and the above described radiological findings, the provisional diagnosis is acute COVID 19 pneumonia.



**Figure 1:** CXR 6 May 20: As compared to previous x-ray of 08-05-2020, the present x-ray revealed the tip of endotracheal tube at level of the carina, it needs to be withdrawn for about 3 cm. Right internal jugular vein approach CVP is seen in place. Regressive course as regard left upper lung zone air space opacities which have resolved. No significant interval changes as regard to the right lung and left mid and lower lung zone ground-glass opacities. Nasogastric tube is seen passing to the abdomen with its tip not visualized in this radiograph. Bilateral basal pleural effusion.



**Figure 3:** 23 May 2020: Follow-up mobile Chest X-ray: semi-sitting AP position. Compared with earlier chest x-ray dated 21/05/2020. Shows significant progression with increased bilateral pneumonic consolidations over the right upper, both mid and lower zones. The pleural effusion the left side, has moderately increased compared with previous chest x-ray. Minimal right pleural effusion noted. No appreciable pneumothorax No other significant detectable interval change.



**Figure 3:** 17 June 2020: Pulmonary angiogram study was done after non-ionic intravenous contrast injection. Coronal and sagittal reformations were done. Observations: Normal contrast filling of the main pulmonary trunk, right and left main pulmonary arteries as well as lobar and segmental branches, seen with a normal tapering up to the periphery with no detectable intraluminal filling defects. Bilateral scattered areas of ground-glass calcification and fibrotic changes seen involving both lung fields. Focal consolidation with cavitation seen in the superior segment of the right lower lobe. Small consolidations also noted in the medial segment of the right middle lobe and posterior segment of the left lower lobe with early necrotic changes. Trachea and major bronchi appear normal. Tracheostomy tube in situ. Impression: No evidence of pulmonary embolism. Consolidations with cavitary changes in the right upper lobe and left lower lobe could likely be due to superimposed infection or infective endocarditis. Bilateral scattered areas of ground-glass calcification and fibrotic changes involving both lung fields consistent with COVID infection.



**Figure 3:** As compared to previous chest x-ray done on 7<sup>th</sup> June 2020, the current study shows resolution of the left lower zone consolidation. No interval changes of the mild consolidation of the right upper zone. No other lung field and both CP angle are clear. No pleural effusion seen.

## Discussion

COVID patients demonstrated abnormalities on CXRs at some point during their illness. On baseline CXR, normal CXR or minimal basal consolidation was the most common finding (47%), followed by GGO (33%). Peripheral (41%) and lower zone distribution (50%) were the more common locations, and most had bilateral involvement (50%). Pleural effusion was found in 3% [1].

Our patient had focal consolidation with cavitation seen in the superior segment of the right lower lobe. Small consolidations also noted in the medial segment of the right middle lobe and posterior segment of the left lower lobe with early necrotic changes which are directly attributable to COVID as this necrosis does not fit in the following common differential diagnosis of cavitating pneumonia clinically and radiologically (see below) and after the treatment it resolved completely and hence proved to be COVID induced.

## Differential diagnosis

1. Lung abscess: No history of previous lung diseases, no history of aspiration or loss of consciousness, hence aspiration followed by lung abscess is rare possibility and the radiological picture does not favour lung abscess.
2. Cavitating infarct: CTPA was done, but it ruled out any infarct in the concerned territory of blood vessels and diagnosed as necrotizing pneumonia.
3. Cavitating malignancy: Young patients, non-smoker and sudden onset of infective symptoms and the radiological picture does not favour cavitating malignancy.
4. TB: No history of previous TB and short history of presentation consistent with acute infection and COVID was positive and AFB smear and culture and TB PCR negative ruled out TB.
5. Fungal pneumonia: Immunocompetent, young female with no risk factors for fungal and ET aspirate was also negative for fungal elements goes against the diagnosis of fungal pneumonia.

We propose CXR categories (VATS scoring system of COVID19 CXR) in an effort for the standardized CXR reporting of COVID-19 based on current literature and our vast experience. We acknowledge that for patients with CXR findings that could be attributed "viral pneumonia" but considering this global pandemic all CXR findings with clinical history should be considered as COVID until proved otherwise. Consensus between local imaging and clinical providers is essential to establish an agreed-upon approach.

CXR is the first and easily available and cost effective tool for the assessment of the radiological infiltrates in majority of patients although, in initial cases with grade 0 or grade 1 it may be missed due to interobserver intra-observer variability and or technical quality of CXR film [2].

In another study of Chest X-rays in COVID 19 patients (N = 30) patients were classified as normal, classical, and indeterminate according to BSTI COVID-19 CXR classification. Two patients had normal chest X-rays (7%) and seven patients (23%) had classical picture of bilateral peripheral, basal ground glass haze/consolidation. Rests of twenty-one patients (70%) were falling in indeterminate group with one (3%) having unilateral lung disease and 20 (67%) patients had bilateral lung disease. Diffuse lung involvement was seen in three (10%) and peripheral lung involvement in 18 (60%) of patients. Majority of indeterminate patients, 19 (63%) had bilateral middle and lower zonal involvement and only two (7%) patients had middle zone involvement. Associated features in indeterminate group were pleural effusion four (13%), old healed calcific granulomas one (3%), and bilateral hilar lymphadenopathy one (3%). There were no cavitating lesions or pneumothorax [3].

Another review published in clinics imaging also did not find any gradually organising and necrotising pneumonia [4], hence this case is unusual and with the risk of developing pyo-pneumothorax if the necrosis extends and involve the pleura and ruptures in pleural space.

At present time, CT screening for the detection of COVID-19 is not recommended by most radiological societies although it has been extensively studied in most of the affected countries (China) and guidelines has been issued as well, but for the resource limited countries and for huge numbers of patients with overwhelmed health care system, VATS grading of radiological severity could be an easily used tool to predict the probability and severity and the intensity of management plans and the prognosis as well. Although this scoring system need to be validated in long term and large number of patients to have more accuracy, predictability, sensitivity, and specificity but till then we can definitely employ in our daily clinical practice to assess the COVID pts severity assessment. However, we anticipate that the use of CT in clinical management as well as incidental findings potentially attributable to COVID-19 would be more accurately detected by CT scan. We believe that Clear and frequent communication among clinicians and radiologists, is imperative to improving patient care during this pandemic. We believe it important to provide radiologists and referring providers guidance and confidence in reporting these findings and a more consistent framework to improve clarity.

### Conclusion

COVID Patients may present radiologically in varies pattern however most of the time is basal faint ground glass opacities and with more severe involvement it can show primarily peripheral infiltrates (VATS Reverse pulmonary oedema sign) and diffuse involvement with ARDS pattern. however, they may present as organising pneumonia and cavitation with subsequent pneumothorax and pyo-pneumothorax as well, hence these complications should always be keep in mind while encountering sudden worsening of any COVID patient to take proactive steps in time.

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