



## CASE REPORT



# Sars-Cov-2 Pneumonia With Subcutaneous Emphysema: A Case Report

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### Abstract

**Introduction:** Severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) SARS-CoV-2 is a novel virus first case reported in Wuhan, China. Now has spread to rest of the world infecting more than 1,000,000 population world-wide. Since it is a novel disease very few is known about the disease and its effect on patients. Furthermore, subcutaneous emphysema is an uncommon complication of SARS-CoV-2 pneumonia. Here, we discuss a fatal case of SARS-CoV-2 pneumonia with subcutaneous emphysema.

### Patient concerns:

A 66-year-old female, diagnosed as SARS-CoV-2 with 60-70% fibrous of both lung developed extensive air-space opacities, pneumonia and subcutaneous emphysema which was confirmed by x ray chest. Subcutaneous emphysema was found in neck, bilateral chest walls, and both upper limbs, extending till abdomen wall and groin.

### Diagnosis:

This patient was diagnosed to have SARS-CoV-2 infection after laboratory-confirmation by Reverse Transcription Polymerase Chain Reaction (RT-PCR), at the time of diagnosis of SARS-CoV-2 patient had developed 60-70% fibrosis of both lungs which was confirmed by Computerized Tomography (CT) of lung Figure 1, patient had an underlying comorbid condition of Diabetes Mellitus (DM) and systematic Hypertension (HT). Patient on the course of illness developed Pneumonia and subcutaneous emphysema, which was confirmed by chest X-ray.

### Interventions:

She was managed initially with Non-Re Breather Mask (NRBM) with 15 litres of oxygen, with which she was able to maintain Oxygen Saturation (spo<sub>2</sub>) of 98%, later on the course of illness her respiratory distress started to worsen and she was connected to Bi level Positive Airway Pressure (BiPAP) even with that her condition started to deteriorate so she was shifted to Intensive Care Units (ICU) for advance life support and care in the ICU, she was connected to Non-invasive ventilation (NIV), during the hospitalization she received vasodilators, antibacterial, steroids, anti-coagulants and antiviral therapy.

### Outcomes:

She died on the tenth day of course of hospital stay.

### Conclusions:

Subcutaneous emphysema may occur in patients with SARS-CoV-2 infection as a rare complication.

## 1 | INTRODUCTION

Since 2019, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections has affected more than 1,000,000 populations, and resulted in thousands of deaths in the world wide. So far, there are many publications reporting the various clinical features of SARS-CoV-2 infection and their outcomes.<sup>(1,2)</sup> nevertheless, very few publications reported in detail about the rare complications of SARS-CoV-2 pneumonia which includes subcutaneous emphysema. We here report a fatal case of SARS-CoV-2 infection with rare complications.

## 2 | CASE REPORT 1

A 66-years-old female had sever cough with expectoration for two days then on the fourth day of illness she developed sever breathlessness for which she visited hospital .She was advised to undergo investigation for SARS-CoV-2 ,she underwent RTPCR test and she tested positive for SARS-CoV-2 , CT lung was also done on the same day because of her clinical symptom of respiratory distress which then revealed pan lobar fibrosis involving 60-70% of lung Figure 1 .Patient was referred to higher centre for managing SARS-CoV-2 infection. The patient had a past history of DM and systemic HT .On examination patient was obese, her body temperature and blood pressure were 37.2°C and 149/85 mm Hg, respectively, respiratory rate was high 33 breaths /min during admission, while pulse rate was 78 beats /min in regular rate and rhythm . The breath sounds of both lungs were thick, dry and wet rales was heard at the lung base. The heart boundary was enlarged to the left and down S1 and S2 was heard .On investigation total leukocyte count was found to be elevated ( 33290/ per micro liter) which was due to underlying secondary . She was managed initially with NRBM and was requiring about 15 litres of oxygen through NRBM ,with which she was able to maintain spo2 of 98% she was given vasodilators, higher antibiotics, steroids ,anti-coagulants and antiviral therapy on the first day of course of hospital stay, later on the third day of hospital stay her respiratory distress started to worsen and she was connected to *BiPAP* on the

fifth day of her hospital stay and even with that her condition started to deteriorate, so on the seventh day of hospital stay she was shifted to Intensive Care Units( ICU) for advance life support and care in the ICU because of the severity of disease .There was further worsening of her condition, she was in severe respiratory distress and had to connect her to NIV, she was requiring fio<sub>2</sub> of 100 and peep of 10, despite of which the SPO<sub>2</sub> fluctuated between 89% to 95%, C-Reactive Protein (CRP) was found to be increasing from 114 µg/m to 149 µg/m , tocilizumab was also given .On the eighth day of hospital stay bedside chest x ray was done as she had swelling on the chest wall and on examination clinically crackling was felt on her chest wall ,chest x ray Figure 2 revealed white lung with subcutaneous emphysema on the chest walls extending on both arms. Subcutaneous emphysema was found to be extensive and progressive spreading from neck to bilateral chest walls, both upper limbs and extended till abdomen wall and groin area. Outcome was discussed in detail with family members they decided not to undergo any invasive procedure and to continue only current supportive care and to focus on comfort measures of the patient during the hospital stay. There was no significant improvement in her condition on the 10<sup>th</sup> day of her hospital stay her blood pressure dropped to 78/45 mm Hg, Nor adrenaline was increased to 1.5 µg/kg min, accompanied with rapid fluid infusion. However, the blood pressure and heart rate did not rise. Suddenly she sustained a sudden cardiac arrest with rhythm being asystole

## 3 | CASE REPORT 2

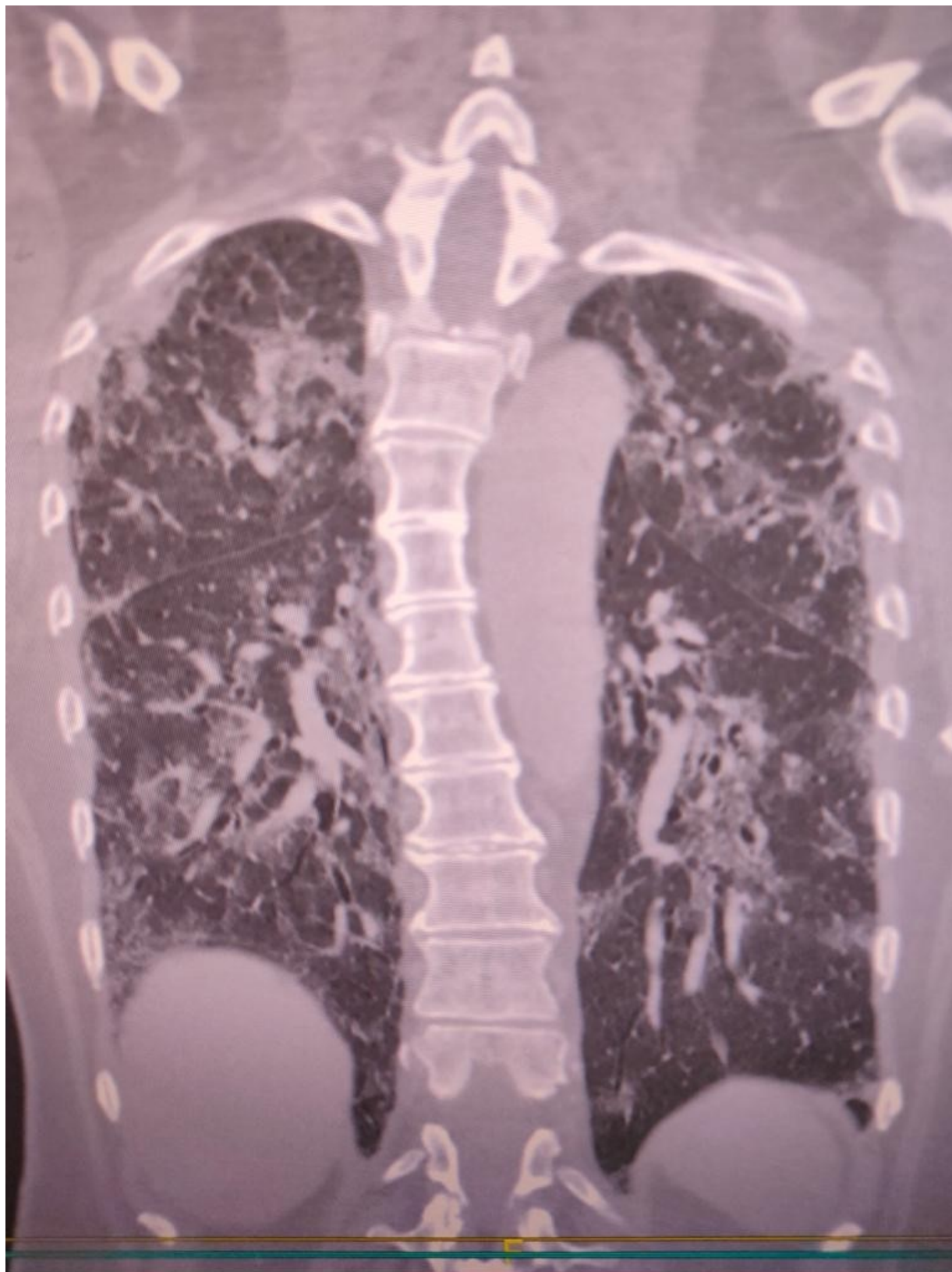
A 55 years old male, came with the complaints of dry cough, body ache since, loss of smell and

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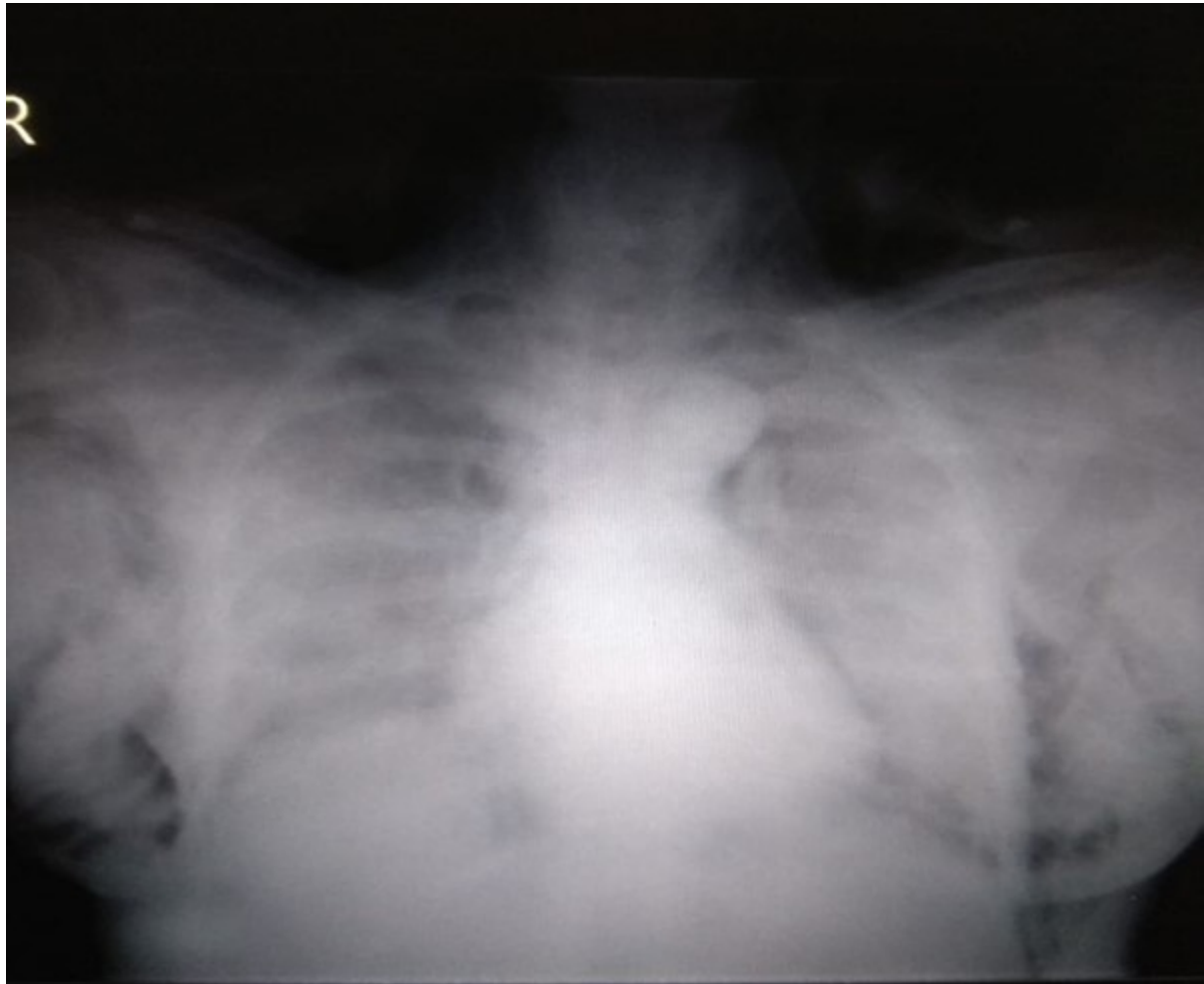
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**FIGURE 1:** Multi focal ground glass opacities and fibrosis noted in bilateral lung field predominantly in peripheral and basal distribution involving 50 -70% of both the lung parenchyma



**FIGURE 2:** Chest x ray (bed side) *Antro-posterior view* showing extensive subcutaneous emphysema.

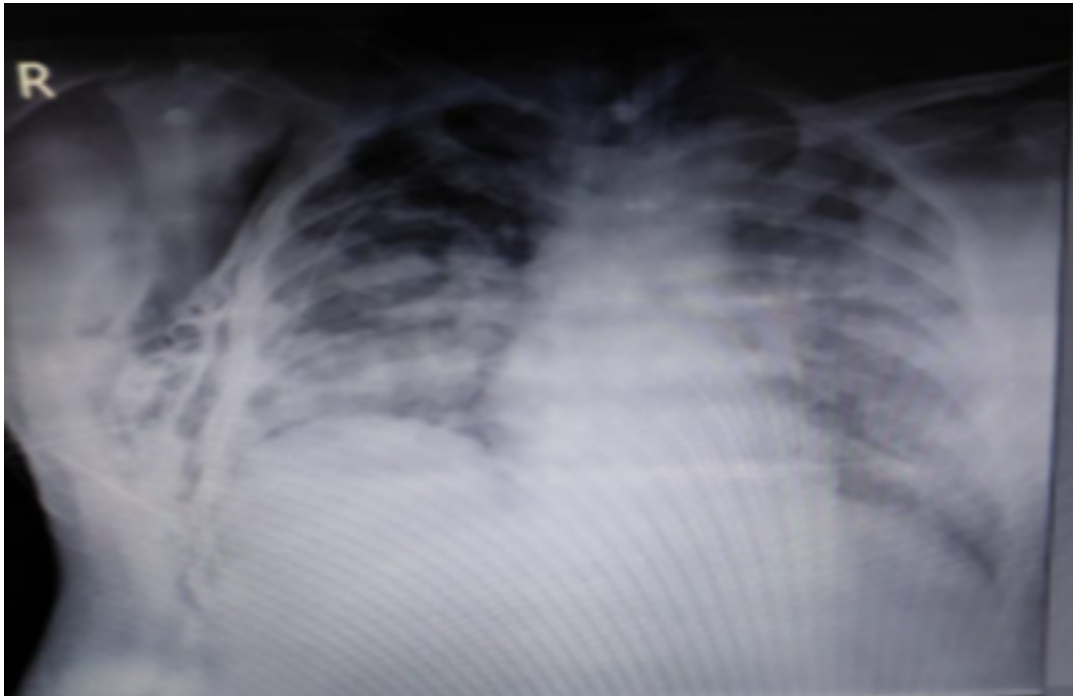
taste for past ten days and past two days patient developed breathlessness for which patient visited hospital, he was started initially on NRBM 15 liters  $O_2$  for a day but gradually not able to maintain saturation, became restless hence shifted to ICU and was connected to NIV support ,Patient has a history of Systemic hypertension regular medication for hypertension was continued during the hospital stay along with standard guidelines for treating COVID-19 which included Remdesivir, Fabipiravir, multi-vitamins, anticoagulant and antimicrobials. On the third day of the hospital stay patient become very hypoxic, there was rapid desaturation to  $SpO_2$  below 60% eventually patient was intubated and connected to mechanical ventilation patient later developed right side pneumothorax with subcutaneous emphysema ,After the insertion of ICD, the patient maintained his saturation ( $spo_2$  89-90%),at the night

He sustained a sudden cardiac arrest, cardiac monitor showed asystole, carotid pulse was not felt. As per ACLS protocol, CPR was initiated and Inj.Adrenaline IV was given every 3mins. Despite of all resuscitative measures, the patient could not be reverted and hence declared dead on the third day of hospital stay.

#### 4 | DISCUSSION

This patient with SARS-CoV-2 pneumonia developed subcutaneous emphysema and aggravated respiratory failure , probably the lung alveoli are prone to rupture because of diffuse alveolar injury which was caused by SARS-CoV-2. (3) Usually the alveolar injuries led to alveolar rupture in turn caused air leakage outside and causing subcutaneous emphysema. (4) . Mostly subcutaneous emphysema





**FIGURE 3:** Chest x ray (bed side) of 55 years old male Antro-posterior view showing pneumothorax with extensive subcutaneous emphysema.

are anticipated in ICU patient when incubated or any intervention done, which may cause iatrogenic trauma to lung parenchyma in turn causing subcutaneous emphysema but in our case no such invasive intervention was done to the case but she developed subcutaneous emphysema. Similar subcutaneous emphysema has been reported in a patient SARS-CoV-2 infection without invasive ventilation, it might have occurred because the elasticity of the alveolar wall and the tolerance are weakened by SARS-CoV-2 infection further leading to subcutaneous emphysema. <sup>(5)</sup>

Subcutaneous emphysema is uncommon in virus pneumonia. It has been rarely reported in influenza infections. <sup>(6, 7)</sup> The pathophysiology of subcutaneous emphysema in those cases were due to increase alveolar pressure through coughing along with alveolar damage caused by the virus by infecting both type I and II pneumocytes and secondary pulmonary infections has led to breakdown of the alveolar membrane integrity. <sup>(8)</sup> Thereby the damage of alveolar membrane in case of corona virus infections can be due to similar mechanism, leading to alveolar rupture and thereby causing subcutaneous

emphysema.

Subcutaneous emphysema is mostly benign and is self-limiting disease. The treatment approach mainly includes rest, oxygen therapy and analgesia. <sup>(9)</sup> A predisposing factors like COPD (Chronic Obstructive Pulmonary Disease), precipitating factor like severe cough (which is one of the symptoms of SARS-CoV-2) and extensive pulmonary lesions caused by SARS-CoV-2 should be managed properly to prevent subcutaneous emphysema.

## 5 | CONCLUSION

The clinical course seems to be more unfavorable with poor outcome when the lung lesions are extensively involved leading to subcutaneous emphysema, as in the case of our patient.

In SARS-CoV-2 patients with extensive lung involvement, subcutaneous emphysema can be anticipated as a rare complication and need close monitoring of those patients to prevent and also to manage subcutaneous emphysema promptly.

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