

## Case Report

# Conservative management of subcutaneous emphysema and pneumomediastinum in a COVID-19 viral pneumonia patient-case report

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## ABSTRACT

In viral pneumonia, the incidence of subcutaneous emphysema and spontaneous pneumomediastinum are rare. But it can occur due to COVID-19 SARS (severe acute respiratory syndrome) corona infection. In this condition like COVID-19 disease the underlying pathology may be due to diffuse alveolar injury. High pressure levels in the alveoli can cause to the alveoli to rupture and ultimately to forms subcutaneous emphysema. We report one case of COVID-19 admitted in the hospital and later developed subcutaneous emphysema and pneumomediastinum without mechanical ventilation. He was managed conservatively without any intervention. 45 old male without co morbidities having post COVID-19 subcutaneous emphysema and pneumomediastinum developed without mechanical ventilation and he was managed conservatively without any surgical intervention. In COVID-19 viral pneumonia patients can develop subcutaneous emphysema without mechanical ventilation and should be careful for severe pneumomediastinum which can cause death. It can be managed conservatively in hemodynamic stable condition

**Keywords:** COVID-19, Subcutaneous emphysema, Pneumomediastinum, SARS-corona virus

## INTRODUCTION

COVID-19 disease is caused by the 2019 novel corona virus severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). The number of cases in the United States has reached up to 3.9 million with more than 142,000 deaths as of July 2020.<sup>1</sup> COVID-19 disease causes many symptoms like fever, dry cough, dyspnea, fatigue, and diarrhea. Later as the disease progresses it can worsen the clinical condition of the patients. After few days of disease progression it can rapidly presents as acute respiratory distress syndrome (ARDS), hypercoagulable state, septic shock, renal failure and ultimately multi organ failure.<sup>2</sup>

In subcutaneous emphysema (SE) the gas or air infiltrates in the subcutaneous layer of the skin. In viral pneumonia spontaneous pneumomediastinum is uncommon.<sup>3</sup> The most common causes include recent trauma, surgical procedures, pneumothorax, barotrauma, and infections. The radiolucent areas or dark pockets in the subcutaneous tissue which indicates the presence of gas in subcutaneous plane are radiological findings on X-ray and CT scan. The increased alveolar pressure and diffuse alveolar injury in severe COVID-19 pneumonia can cause to alveoli rupture due to patients having with pronounced cough. To date, there have been some reports on patients with subcutaneous emphysema spontaneous pneumomediastinum from COVID-19 without

mechanical ventilation. Few reports have been published patients with COVID-19 disease can presented with pneumothorax also.<sup>4</sup>

The development of subcutaneous emphysema pneumomediastinum in COVID-19 infection is considered a possible indicator of worsening disease. Current report presents one case of COVID-19 admitted in the hospital and later developed subcutaneous emphysema and pneumomediastinum without mechanical ventilation. He was successfully managed conservatively without any intervention.

## CASE REPORT

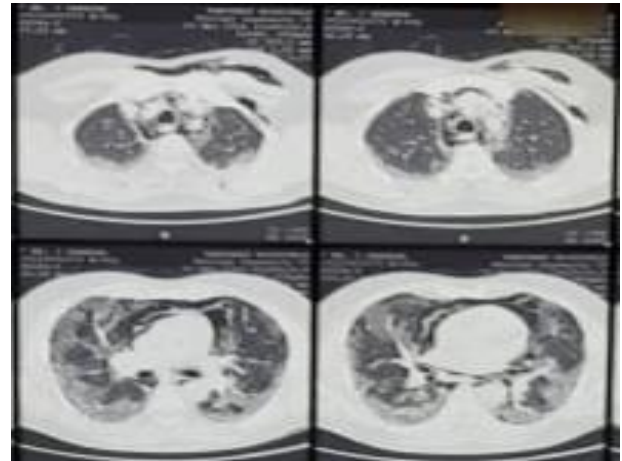
A 45-year old without co morbidities, k/c/o COVID-19 viral pneumonia who was admitted and managed in one private hospital without mechanical ventilation support, came to our hospital with a complaining of bilateral chest and neck and upper limb swelling since 7 days. On clinical examination there was crepitus over the chest and neck and upper limbs which was clinically diagnosed as extensive subcutaneous emphysema. He was apparently normal 20 days back and he was admitted in one private hospital with symptoms of COVID-19 and later he was diagnosed to have COVID-19 disease. He was managed there for 15days without ventilator support. After discharge he had complaints of bilateral neck and chest swelling involving upper limb also. He came to our hospital and he was evaluated and underwent radiological investigations outside.

He was clinically examined and diagnosed to have subcutaneous emphysema post COVID-19 viral pneumonia. Later chest X-ray was done which showed extensive subcutaneous air (Figure 2) and later planned for CT chest. CT scan showing mild pneumomediastinum with subcutaneous areas of radiolucency indicating extensive subcutaneous emphysema mainly extending superiorly in the thorax and into the neck without evidence of pneumothorax. There was suspected tear in the posteriors wall of pharynx. Then he was planned for video laryngoscope which showed normal. Then an esophageal rupture was ruled out by esophagogram and the patient continued supportive care and kept under observation. Gradually he did not require any O2 support. Gradually subcutaneous emphysema was improved clinically over period of 2 weeks without any surgical intervention. He was underwent serial chest X-ray and which showed gradually decrease level subcutaneous air. Then he was discharged after 7 days of admission in a hemodynamic stable condition.

## DISCUSSION

In current case we are discussing about the development subcutaneous emphysema, spontaneous pneumomediastinum and pneumothorax in COVID-19 diagnosed patient with no history of mechanical ventilation.<sup>5</sup>

In most of the cases the pneumomediastinum is occurred due to increased airway pressures that are secondary to mechanical ventilation. It can also occur due to airway obstruction. Some conditions which can cause to increase intra thoracic pressure can also cause to form subcutaneous emphysema.<sup>6</sup> These severe conditions were may be sequel of COVID-19 rather than being an adverse effect of mechanical/barotraumas. Because in our index patient, his previous CT scan was showing subcutaneous radiolucency in limiting area.



**Figure 1: ground glass opacity of bilateral lungs.**



**Figure 2: X-ray chest showing subcutaneous emphysema.**

There have been some previous case reports showing similar data in the setting of COVID-19. It may be due to diffuse alveoli injury in COVID-19 disease. In currentcase the patient had cough that may be additive factor for alveoli rupture. Spontaneous pneumomediastinum may occurred due to interstitial air entered in to mediastinum. It is called as Macklin's phenomenon.<sup>7</sup>

In one study of having 3500 patients showed that 15 out of them were developed subcutaneous emphysema. Out 15 of them 12 (80%) were due to barotrauma and rest of them around 20% due to sequel of COVID-19 disease.<sup>8</sup> Severe acute respiratory syndrome (SARS)-corona virus

is recognized as an etiological factor for causing central and upper airway inflammation. Later it causes to edema of alveoli and vulnerable to injury by instrumentation.

In tracheal injury due to instrumentation, mediastinal emphysema, pneumothorax, dyspnea, dysphonia, cough, hemoptysis and pneumoperitoneum can occur.<sup>9</sup> Subcutaneous emphysema can be diagnosed by chest x-ray but some cases of pneumomediastinum can be missed without a lateral film. CT scan is the definitive diagnostic tool.<sup>10</sup> Some studies shows subcutaneous emphysema, pneumopericardium and potential tracheobronchial injuries along with bilateral infiltrates of lung fields may be due to severe COVID-19 disease.<sup>11</sup> In our index case the occurrence of subcutaneous emphysema also may be due to severity of COVID-19 disease.

## CONCLUSION

Subcutaneous emphysema, pneumomediastinum and pneumothorax are complications of COVID-19 disease itself or these conditions may occur due to management complications of COVID-19 disease. So follow up of the COVID-19 patients should be regular after discharging them from hospital.

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