



Case report

Subcutaneous emphysema and spontaneous pneumomediastinum in non-intubated COVID-19 patient: Presenting unusual case report

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ABSTRACT

Introduction and importance: In non-intubated COVID-19 patients, subcutaneous emphysema and spontaneous pneumomediastinum (SPM) remain rarely, with incidence rates of 3.0 and 1.2 per 100,000, respectively; nevertheless, the occurrence of these conditions in COVID-19 patients is unclear. Up to date only few cases have been reported. The mechanism of pneumomediastinum in non-intubated COVID-19 patients remains unclear.

Case presentation: Here we present a 63-year-old male with subcutaneous emphysema, and spontaneous pneumomediastinum with a 1-day history of chest pain and productive cough, without chills and dyspnea. The patient was diagnosed by nasopharyngeal RT-PCR, Chest CT, and laboratory findings. The patient successfully treated by given double (mask and nasal) oxygen therapy, antibacterial (moxifloxacin tablet 400 mg) every 24 h for 7 days, followed by antiviral (lopinavir tablet 400 mg) twice daily for 6 days and corticosteroid treatments as well as steroid therapy (methylprednisolone 40 mg) daily for 8 days. Subcutaneous emphysema treated by supraclavicular slit-like incision (3 cm) bilaterally and milking of skin from face, neck, shoulders and chest done for three days for subcutaneous emphysema but regarding the pneumomediastinum we did only follow up of the patient.

Clinical discussion: Spontaneous pneumomediastinum and subcutaneous emphysema are rare clinical finding in non-intubation of COVID-19 patients but frequently common in patients with coronavirus acute respiratory distress syndrome (COV-ARDS), or intubated COVID-19. In the present paper, subcutaneous emphysema and spontaneous pneumomediastinum occurred at the same time, with no past history of pulmonary diseases, and smoking of the patient. The only reason of this patient was high-pressure repetitive cough.

Conclusion: The authors declared that COVID-19 infection leading to subcutaneous emphysema and spontaneous pneumomediastinum in non-intubated COVID-19 patients. Our case revealed that oxygen therapy, bed rest, analgesic, and supraclavicular slit-like incision best option for treat subcutaneous emphysema (SE) and spontaneous pneumomediastinum (SPM).

1. Introduction

An outbreak of the novel coronavirus (COVID-19) initially reported at Wuhan, China in December 2019 and declared to be a pandemic by WHO on March 11 [1,2]. In non-intubated COVID-19 patients, subcutaneous emphysema and spontaneous pneumomediastinum (SP) are

very rare, with incidence rates of 3.0 and 1.2 per 100,000, respectively [3]. To date only a few cases have been reported [3–7]. Here, we present an unusual case of 63-year-old male with linked with subcutaneous emphysema and spontaneous pneumomediastinum. This report has been arranged in the line with SCARE guideline [8].

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2. Case presentation

2.1. Patient information

A 63-year-old male patient was admitted to the COVID-19 Centre at Rania Teaching Hospital Kurdistan-Region Iraq, on October 18, 2020, with a 1-day history of chest pain and productive cough, without chills and dyspnea.

2.2. Clinical findings and diagnostic assessment

Afterward, the patient was confirmed of COVID-19 infection by Nasopharyngeal RT-PCR. Chest CT image showed subcutaneous emphysema, and pneumomediastinum bilateral patchy opacity (Fig. 1) (Fig. 2). On presentation, his temperature was 38.2 °C normal range (35.5 °C to 37.5 °C), Blood pressure BP was 136/87 mmHg, normal range (120/80 mmHg), respiratory rate was 18/min, pulse rate 82 bpm and the patient arterial oxygen saturation was 93% at rest without oxygen with no past relevant pulmonary history Diseases, such as COPD, asthma, interstitial lung diseases, drugs, smoking, surgery. Furthermore, Laboratory test results showed C-reactive protein 120 mg/dl (normal range 0.00–0.60 mg/dl), elevated leucocytes $12.3 \times 10^9/l$ (normal range $3.5\text{--}9.5 \times 10^9/l$), lymphocyte $0.84 \times 10^9/l$ (normal range $1.1\text{--}3.2 \times 10^9/l$), neutrophils $4.68 \times 10^9/l$ (normal range $1.8\text{--}6.3 \times 10^9/l$) and blood platelet $106 \times 10^9/l$ (normal range $125\text{--}350 \times 10^9/l$). The patient was negative respiratory syncytial virus, adenovirus, and para influenza viruses. In addition, his liver function tests were normal. On 23 October, 2020, the patient suddenly developed fever+ rigor, cough and shortness of breath. On 27 October 2020, the patient oxygen (SPO2) gradually decreased to 80% with nasal oxygen therapy. On 29 October 2020, his dyspnea deteriorated. Three days later the patient's chest x ray showed subcutaneous emphysema and pneumomediastinum on his chest and neck with nasal speech.

2.3. Therapeutic intervention

The patient was given double (mask and nasal) oxygen therapy, antibacterial (moxifloxacin tablet 400 mg) every 24 h for 7 days, Followed by antiviral (lopinavir tablet 400 mg) twice daily for 6 days and

corticosteroid treatments. as well as steroid therapy (methylprednisolone 40 mg) daily for 8 days. Subcutaneous emphysema treated by supraclavicular slit-like incision (3 cm) bilaterally and milking of skin from face, neck, shoulders and chest done for three days for subcutaneous emphysema but regarding the pneumomediastinum we did only follow up of the patient. He had three negative RT-PCR results of COVID-19 on 2,4,6 November 2020.

2.4. Follow up

The patient discharged on surgical department and transferred for medical department but during follow up the patient unfortunately died with myocardial infarction (MI).

3. Discussion

Spontaneous pneumomediastinum and subcutaneous emphysema are rare clinical finding in non-intubation of COVID-19 patients but frequently common in patients with coronavirus acute respiratory distress syndrome (COV-ARDS), or intubated COVID-19 patients. Only 1% of COVID-19 patients had pneumothorax [9]. CT conclusions most commonly bilateral, multilobar and show vascular enlargements with peripheral ground-glass opacities. During the progress of disease consolidation, reticulation and crazy paving can appear [10,11]. Plural effusion, lymphadenopathy, pneumothorax [11], and complications such as acute limb ischemia [12], hyperbilirubinemia [13], and mediastinal emphysema [14] are extremely rare findings. Following intubation, pneumothorax and/or Pneumomediastinum are more common in persons with COVID-19 [15]. The mechanism of pneumomediastinum in non-intubated COVID-19 patients remains unclear. Up to date, only a few cases have been published [3–7]. In the present paper, subcutaneous emphysema and spontaneous pneumomediastinum occurred at the same time, with no past history of pulmonary diseases, and smoking of the patient. The only reason of this patient was high-pressure repetitive cough. Spontaneous emphysema is defined free air in the mediastinum normally in the absence of trauma and iatrogenic injury. Usually alveolar rupture caused by dissection of air and an increased intrathoracic pressure [15]. Subcutaneous emphysema occurs when the air enters under the skin cells [16]. Pneumomediastinum (PM), a condition

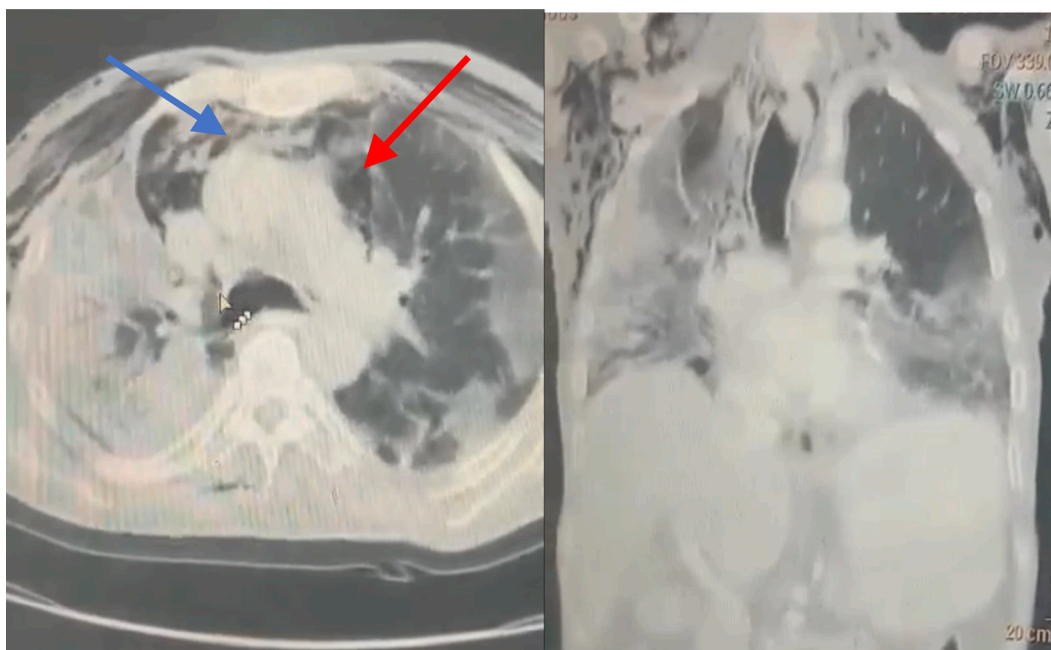


Fig. 1. Axial and coronal views, CT scan of chest showed: subcutaneous emphysema + pneumomediastinum and bilateral opacity (patchy pneumonia).

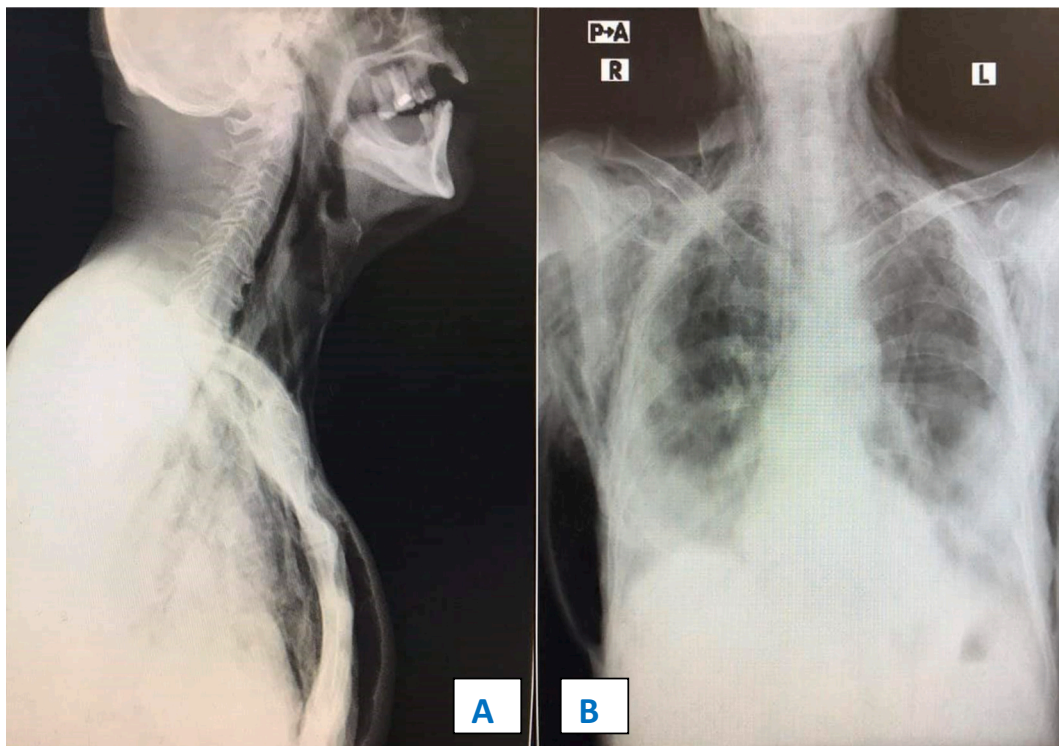


Fig. 2. A&B: CXR PA and Lateral views; Subcutaneous emphysema, and pneumomediastinum.

delineated by the presence of air in the mediastinum, in 1819 was first reported by Laennec, and since 1939 when Hamman described possible aetiologies of spontaneous pneumomediastinum (SP) [17]. According to Macklin in 1944, defined that the rupture of the alveolar tree linked with increased intra-alveolar pressure could release air, then dissects the *peri* broncho-vascular sheath toward the mediastinum, and hilum [18]. This pathophysiological phenomenon, known as the Macklin effect, can be detected in chest computed tomography (CT), which is also the most sensitive test for diagnosing this illness [17]. Pneumomediastinum development is considered a potential predictor of the deterioration of COVID-19 disease, but luckily our patient survived.

4. Conclusion

The authors declared that COVID-19 infection leading to subcutaneous emphysema and spontaneous pneumomediastinum in non-intubated COVID-19 patients. Our case presentation revealed that oxygen therapy, bed rest, analgesic, and supraclavicular slit-like incision best option for treat subcutaneous emphysema (SE) and spontaneous pneumomediastinum (SPM). Further studies are necessary to describe mechanisms.

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Ethical approval

Approval is not necessary for case report in our locality.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this

journal on request.

Author contribution

Rawand A. Essa: Conception and design, execution, analysis and interpretation of data, involved in drafting the article, revised it critically for important intellectual content, read and approved the final version of the manuscript.

Sirwan K. Ahmed: Conception and design, execution, analysis and interpretation of data, involved in drafting the article, revised it critically for important intellectual content, read and approved the final version of the manuscript.

Dunya H. Bapir: involved in drafting the article, revised it critically for important intellectual content, read and approved the final version of the manuscript.

Chawan P. Abubakr: involved in drafting the article, revised it critically for important intellectual content, read and approved the final version of the manuscript.

Registration of research studies

Not applicable.

Guarantors

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Declaration of competing interest

No competing interests were disclosed.

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