



Case Report

Subcutaneous emphysema and spontaneous pneumomediastinum in non-intubated COVID-19 patient: The first case report in Syria

Mohamad Abbas^a, Hidar Alibrahim^b, Mohamad Hasan^a, Abdullah Khouri^a, Bisher Sawaf^c, Sarya Swed^{b,*}

^a Department of Pulmonology, Aleppo University Hospital, Aleppo, Syria

^b Faculty of Human Medicine, Aleppo University, Aleppo, Syria

^c Faculty of Human Medicine, Private Syrian University, Damascus, Syria

ARTICLE INFO

Keywords:

Subcutaneous emphysema
Spontaneous pneumomediastinum
Non-intubated COVID-19 patient
Case report

ABSTRACT

The complications of covid-19 may include pneumonia, acute respiratory distress syndrome (ARDS), multi-organ failure, septic shock, and death. Subcutaneous emphysema with as a complication of covid-19 has been documented in a few cases in the medical literature as case reports. A 36-year-old patient with covid-19 complained of symptoms of fever and dyspnea with no history of trauma or smoking. After computed tomography scan and x-ray, it was found that there was Subcutaneous emphysema and spontaneous pneumomediastinum. The medical treatment of corticosteroids and intravenous anticoagulant was immediately performed to improve the patient's condition significantly. The patient was discharged with nearly full recovery. We did the following-up for the patient and the results were good. The combination of these two complication is a reality for Covid-19 patients, so a quick and accurate diagnosis and continuous follow-up should be taken into account to avoid the danger to the patient's life as a result of the formed dyspnea.

1. Introduction

Corona virus is a type of virus that has RNA and can infect humans and animals. In humans, they cause respiratory tract infections that can range from mild to lethal. In December 2019, the first outbreak of the emerging coronavirus 2 (SARS-CoV-2) that causes acute respiratory syndrome was reported in Wuhan, China. Then a few months later, the World Health Organization considered the novel coronavirus that causes severe acute respiratory syndrome a global pandemic and declared a global health emergency. The most important symptoms accompanying the acute respiratory syndrome caused by the novel corona virus are fever, headache and fatigue, in addition to coughing and dyspnea. Symptoms may begin one to fourteen days after exposure to the virus and at least a third of people who are infected do not develop noticeable symptoms [1]. For diagnosis, the most important methods used include: reverse transcription polymerase chain reaction (RT-PCR) or other nucleic acid testing of infected secretions [2,3], and computed tomography plays an important role in diagnosis in individuals who have clear clinical symptoms [4] in addition to it is also useful in identifying serious

complications that are very rarely associated with the disease such as pneumothorax, pneumomediastinum, subcutaneous emphysema. Unfortunately, as of now, there is no effective treatment for coronavirus disease 2019 (COVID-19), the disease caused by the SARS-CoV-2 virus. Therefore, the currently recommended treatment is supportive care, which includes treatment to relieve symptoms, fluid therapy, oxygen support and prone positioning as needed. Here we present a case report of one of the rare complications of coronavirus disease, which is subcutaneous emphysema and spontaneous pneumomediastinum.

This case report has been reported in line with the SCARE criteria [5].

2. Case presentation

A 36-year-old male, nonsmoker presented to emergency department with fatigue, severe dyspnea, productive cough, and fever. There is no previous medical, surgical or allergic history. The physical examination revealed arterial oxygen saturation (SpO₂) of 70% with room air improvement to 90% with oxygen, respiratory rate 35/min, heart rate

* Corresponding author.

E-mail addresses: mhd-abbas@hotmail.com (M. Abbas), haideralibrahim1999@gmail.com (H. Alibrahim), hamreen229@hotmail.com (M. Hasan), A.Khouri@gmail.com (A. Khouri), bishersawaf.94@gmail.com (B. Sawaf), saryaswed1@gmail.com, bishersawaf.94@gmail.com (S. Swed).

<https://doi.org/10.1016/j.amsu.2021.103074>

Received 15 October 2021; Received in revised form 11 November 2021; Accepted 15 November 2021

Available online 19 November 2021

2049-0801/© 2021 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

105/min and blood pressure 130/80 mmHg. On auscultation, bilateral coarse crepitation was audible throughout both the lung fields. An area of subcutaneous emphysema was also felt on palpation of the upper thoracic wall, neck and the upper limbs.

Laboratory tests showed a leukocyte count of $10 \times 10^9/L$ (normal $4-10 \times 10^9/L$). C-reactive protein (CRP) and lactate dehydrogenase (LDH) were elevated as follows: 103 mg/L (normal up to 6 mg/L) and 1712 U/L (normal up to 450 U/L). D. Dimer was 598 ng/ml. Then chest X-Ray (Fig. 1) and a non-contrast CT of the chest was ordered, which revealed bilateral ground-glass opacities prominent posteriorly, with evidence of air lucencies around the trachea, heart, and the large vessels in the mediastinum. Subcutaneous emphysema was also observed in the upper anterior thoracic wall and no pneumothorax was seen. (Fig. 2). To confirm the high suspicion of COVID-19, coronavirus nucleic acid test (NAT) via real-time fluorescence polymerase chain reaction (RT-PCR) was ordered, which came out positive. Thereafter, the patient was admitted to the COVID-19 isolation ward on the day of the presentation. A second chest CT was done and it showed obvious shrinking of the pneumomediastinum and subcutaneous emphysema (Fig. 3).

The patient was given oxygen through a face mask at 5L/min to 8 L/min. At that time, his SpO₂ was maintained at 90% with oxygen at rest. He was started with the daily medication regimen of thromboprophylaxis (enoxaparin 40 mg subcutaneous), intravenous (IV) dexamethasone 6 mg and other supportive therapies. To treat Spontaneous pneumomediastinum and subcutaneous emphysema, a consultation of a thoracic surgeon was done and the recommendations were only observation.

During 15 days at hospital the patient gradually improved and his spo₂ was 93% without oxygen at rest. Finally the patient was discharged with nearly full recovery.

3. Discussion

Spontaneous pneumomediastinum is an uncommon clinical occurrence in the general population. It has been reported to be relatively prevalent among the young population with an incidence rate of 1/25,000 between the ages of 5–34 years. The majority of patients are male in more than 75% of the cases. Meanwhile, subcutaneous emphysema can also be detected in 70% of the patients of spontaneous pneumomediastinum. The clinical presentation of both spontaneous pneumomediastinum and subcutaneous emphysema can range from being asymptomatic to various symptoms including dyspnea, cough, dysphagia, and chest pain and voice changes [6]. Spontaneous



Fig. 1. Bilateral ground-glass opacities prominent posteriorly on chest x-rays.



Fig. 2. There is no pneumothorax on computed tomography.

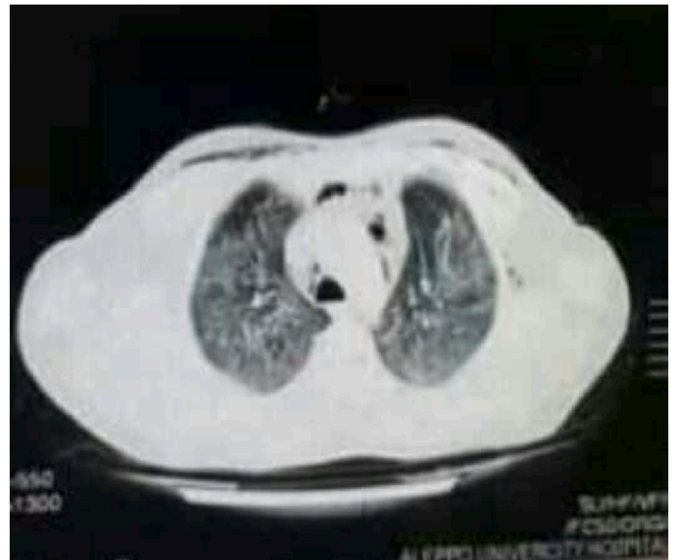


Fig. 3. Pneumomediastinum and subcutaneous emphysema.

pneumomediastinum is a rare condition, most commonly caused by medical conditions such as asthma, chronic lung disease, infections and mechanical ventilation. While most cases are self-limited and managed conservatively, the condition must be monitored carefully as it can lead to life threatening circulatory and respiratory pathology [7].

Spontaneous pneumomediastinum is uncommon in viral pneumonia. It has been reported in cases with severe acute respiratory syndrome-associated coronavirus pneumonia [7]. Although the exact mechanism is unknown, increased alveolar pressure and diffuse alveolar injury in severe COVID-19 pneumonia is common which may make the alveoli more prone to rupturing, especially as patients often have pronounced cough, as our patient [7]. To date, there have been few reports on spontaneous pneumomediastinum from COVID-19 in the setting of non-mechanical Ventilation, although some cases have been complicated by pneumothorax. The development of pneumomediastinum in COVID-19 infection is considered a possible indicator of worsening disease, but our patient fortunately survived [7]. Here we have a patient with covid 19 with subcutaneous emphysema and pneumomediastinum

without any history of trauma. The diagnosis was made by computed tomography scan and x-rays. Dexamethasone and enoxaparin were given and the patient's condition was improved.

4. Conclusion

In this paper, the focus was on the topic of subcutaneous emphysema and spontaneous pneumomediastinum resulting from acute infection with the Corona virus (COVID-19), where we initially talked about the general symptoms of the Corona virus, then we focused on these rare complications, given that the patient is not subject to intubation, and this raises attention, considering that these complications in themselves are very dangerous in addition to the risk of acute infection with the emerging corona virus, as studies are still progressing in order to know many details, so we must note that such complications need special care with a longer stay in the hospital, and we advise doctors to read more information about serious complications related to this disease, even if they are rare, because they will raise their efficiency in quick measure.

Ethical approval

N/A.

Sources of funding

There are no sources of funding.

Author contribution

MOHAMAD ABBAS: contributed in writing manuscript and data collecting. Hidar Alibrahim : contributed in writing manuscript. MOHAMAD HASAN : contributed in writing manuscript. ABDULLAH KHOURI : contributed in reviewing the paper. Bisher Sawaf : contributed in reviewing the paper. Sarya Swed : contributed in reviewing the paper

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.

Research registration

Not applicable.

Guarantor

Sarya Swed.

Declaration of competing interest

All authors declare no conflict of interest.

Acknowledgement

We would like to say thanks to Dr. Weam Ezzdean for his great efforts. Dr. Weam saved neither time nor effort in editing the English language of this article by checking the spell, grammar, and syntax.

Provenance and peer review:

Not commissioned, externally peer-reviewed.

References

- [1] D.P. Oran, E.J. Topol, January, The proportion of SARS-CoV-2 infections that are asymptomatic : a systematic review, *Ann. Intern. Med.* 174 (5) (2021) M20–6976, <https://doi.org/10.7326/M20-6976>. PMC 7839426. PMID 33481642.
- [2] C. Li, C. Zhao, J. Bao, B. Tang, Y. Wang, B. Gu, November, Laboratory diagnosis of coronavirus disease-2019 (COVID-19), *Clin. Chim. Acta; Int. J. Clin. Chem.* 510 (2020) 35–46, <https://doi.org/10.1016/j.cca.2020.06.045>. PMC 7329657. PMID 32621814.
- [3] 114] T. Ai, Z. Yang, H. Hou, C. Zhan, C. Chen, W. Lv, , et al. August, Correlation of chest CT and RT-PCR testing for coronavirus disease 2019 (COVID-19) in China: a report of 1014 cases, *Radiology* 296 (2) (2020) E32–E40, <https://doi.org/10.1148/radiol.2020200642>. PMC 7233399. PMID 32101510.
- [4] S. Salehi, A. Abedi, S. Balakrishnan, A. Gholamrezanezhad, July, Coronavirus disease 2019 (COVID-19): a systematic review of imaging findings in 919 patients, *AJR Am. J. Roentgenol.* 215 (1) (2020) 87–93, <https://doi.org/10.2214/AJR.20.23034>. PMID 32174129.
- [5] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, for the Scare Group, The SCARE 2020 guideline: updating consensus surgical CAse REport (SCARE) guidelines, *Int. J. Surg.* 84 (2020) 226–230.
- [6] T.A. Jatou, A.A. Khan, O. Mohiuddin, M.S. Choudhry, F. Yasmin, S. Jalees, Spontaneous pneumomediastinum and subcutaneous emphysema in a non-intubated COVID-19 patient: a case report, *The Pan Afr. J. Med.* 38 (2021) 37, <https://doi.org/10.11604/pamj.2021.38.37.27543>.
- [7] *Pan Afr. J. Med.* 38 (37) (2021), <https://doi.org/10.11604/pamj.2021.38.37.27543>.