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A case report of pneumomediastinum and subcutaneous emphysema associated with pandemic COVID-19 in a 43-year-old man

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ABSTRACT

COVID-19 is a newly emerging disease with high mortality among the elderly and patients with underlying medical conditions. We report the case of confirmed COVID-19 infection complicated with pneumomediastinum.

1. Introduction

COVID-19, a novel coronavirus, caused a global pandemic in March 2020.[1] First covid patient was diagnosed with atypical viral pneumonia in Wuhan, China, in late December 2019.[2] The coronavirus family was first characterized in the 1960's. They cause wide range of respiratory symptoms. COVID-19 can be asymptomatic or present with mild to severe symptoms such as severe pulmonary involvement with patients requiring assisted ventilation. It can also undergo rapid mutations and frequent recombination for many years.[3–5] The virus has an incubation period of 2–14 days. Many infected subjects are asymptomatic or may present with mild respiratory symptoms that overlap with common cold and influenzas. Others can present with fever (77–98%), cough (46%–82%), myalgia or fatigue (11–52%), and shortness of breath (3–31%). Other symptoms may include runny or stuffy nose, sore throat, cough with sputum production, hemoptysis, headache, body aches, diarrhea, and nausea. The reference standard for diagnosis is throat swap RT-PCR (SARS-CoV-2 RNA) of the live virus, which can last for 24–72 h.[6,7] According to the World Health Organization (WHO), about 20% of patients with COVID-19 experience severe respiratory failure and may require oxygen or mechanical ventilation.[1,8] Computed tomography of the chest in early stages for those with pneumonia demonstrates bilateral peripheral ground-glass opacities.[9,10]

Pneumomediastinum (PM) is defined as an air trapping in the mediastinal spaces and is classified into two types; spontaneous and secondary pathology.[11,12] PM is an uncommon complication of a respiratory disease such as RSV,[13] Influenza,[14] Asthma,[15] and HSV.[16] Patients may be asymptomatic or present with chest pain (58, 37.2%), dyspnea, fever, vomiting, subcutaneous air/crepitus, and dysphagia.[17,18] Secondary PM in COVID-19 patients is reported to be a complication of mechanical ventilation and difficult intubation.[19–21]

This is the first case of laboratory-confirmed COVID-19 virus in the western region of Iran, which was complicated with pneumomediastinum. In a review of English literature, our case is the second patient with confirmed COVID-19 complicated with pneumomediastinum.

2. Case description

A 43-year-old man with a four-day history of cough (without sputum), headaches, myalgia, fatigue, and progressive shortness of breath referred to the emergency department of the Saqqez Hospital, Kurdistan University of medical Sciences, Sananadaj, Iran. His family members, including wife, son, and father-in-law, also had similar, but mild symptoms for past two weeks. The patient was a non-smoker, with no past health issues, and was not on any medications. His vitals were as follows: normal blood pressure, tachycardia (120/min), tachypnea (30/min), and oxygen saturation of 93%. Physical examination was

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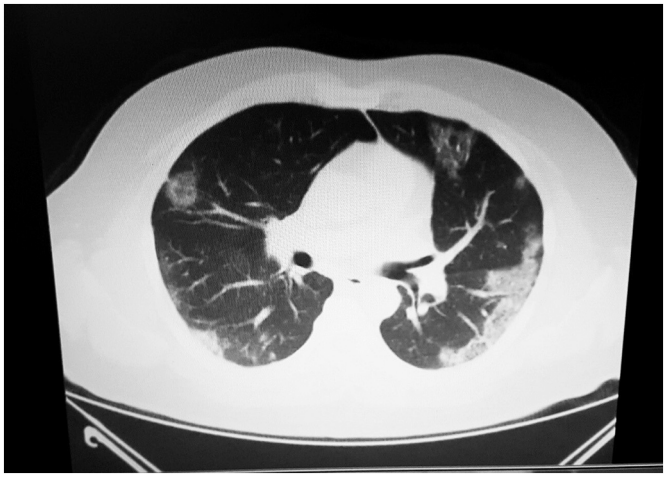

Fig. 1. Chest Ct Scan at the level of upper mediastinum of a patient with confirmed COVID-19 shows bilateral peripheral ground glass opacities.

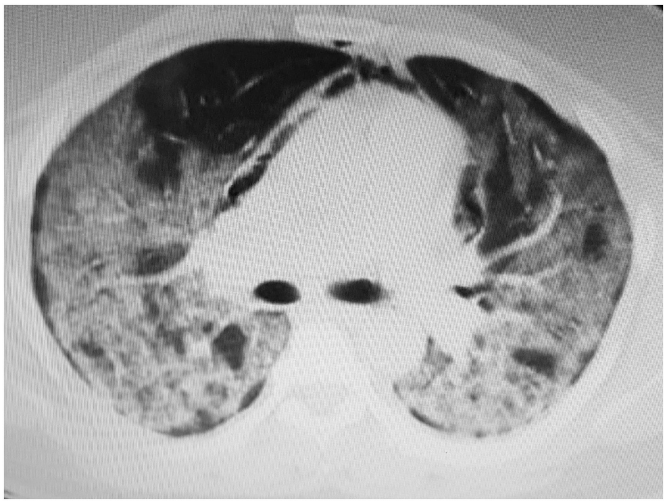

Fig. 2. Chest Ct Scan at the level of great vessels of a patient with confirmed COVID-19 demonstrates bilateral consolidation, ground glass opacities as well as air (pneumomediastinum) along the right mediastinal border.

significant for course crackle in bilateral lung bases and normal cardiac exam. The computed tomography (CT) scan showed bilateral multilobar peripheral consolidations and ground-glass opacities, crazy-paving patterns with the peripheral distribution that was more prominent in the posterior and lung bases (Fig. 1); however, CXR was not obtained and also invasive ventilation was not used.

Laboratory examination revealed arterial blood gas: pH: 7.45, paO2: 70 mmHg, paCO2: 46 mmHg, bicarbonate 28 mmol/L, C reactive protein: positive (4+), positive polymerase chain reaction for COVID-19 (RT-PCR), normal renal and liver function tests as well as normal electrolyte levels, hematology: hemoglobin 16.6 g/Dl, white blood cell counts 4.3 * 109 cells/L, and platelet count 121 * 109 cells/L.

The patient was admitted to an isolated critical care unit with noninvasive monitoring, including facial mask O2 (5L/min) and started on imipenem 500 mg, (per 6 h) and omeprazole gastric ulcer prophylaxis. The patient was also started on a three-drug treatment regimen according to the Ministry of Health's Guidelines [Chloroquine phosphate 150 mg (single dose), Lopinavir 200 mg (twice a day), and Ribavirin 1200 mg (daily)]. On the second day of admission, he developed worsening chest discomfort (retrosternal pain) and neck swelling with crepitus. The patient's heart sounds were muffled but normal. The

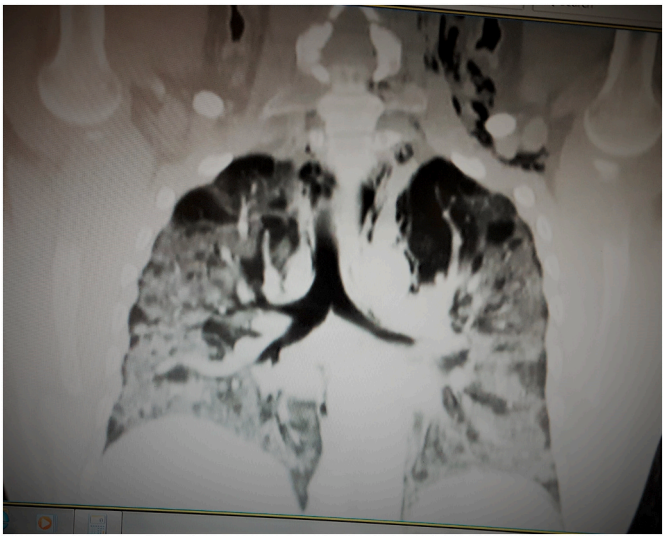

Fig. 3. Coronal computed tomography of the chest demonstrated pneumomediastinum as well as left lower neck subcutaneous emphysema.

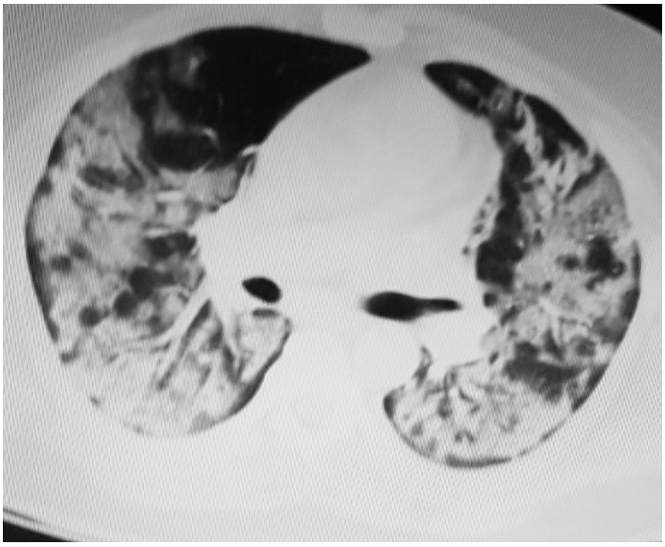

Fig. 4. CT axial chest at below the carina demonstrates bilateral consolidations with resolution of pneumomediastinum.

oxygen saturation dropped by 78%, and respiratory rate reached 36 per minute. Emergent CT chest without contrast was performed, which demonstrated improved pulmonary parenchymal findings and new pneumomediastinum with subcutaneous emphysema (Figs. 2 and 3). The patient was started on hydrocortisone 100 mg (per 6 h) and intravenous vitamin C. He remained in the critical care unit for the next few days with no change in his treatment regimen. His neck swelling and chest discomfort were improved. Repeated CT on the seventh day of the admission was performed, which demonstrated the resolution of pneumomediastinum and subcutaneous emphysema with persistent bilateral ground-glass opacity (Fig. 4). The patient was discharged home asymptomatic with oxygen saturation of 93% on room air on day 14. We did not repeat RT-PCR prior to his discharge. The patient was isolated at home and followed by his family physician daily for 2 weeks and then mouthy for 3 months.

3. Discussion

COVID19 pneumonia is a new infectious disease due the coronavirus family. It soon became a worldwide threat, and the World health organization declared its pandemic in the early March 2020. At the time of this report, there are approximately thirty million patients confirmed with COVID-19 infection and more than 900 thousand deaths from its complications. Although most of the individuals infected with this novel virus have mild symptoms, it can cause severe respiratory symptoms in the elderly and those with underlying medical conditions. Our knowledge about COVID-19 is unfolding as thousands of researchers around the world are studying different aspects of the disease, including its epidemiology, pathophysiology, diagnosis, treatment, and prognosis. The Chest CT Scan has been proved to be a valuable tool in screening the complications of COVID-19 pneumonia. In the early stages, there are bilateral ground-glass opacities that can progress over time to diffuse consolidations. A patient with positive COVID-19, confirmed based on laboratory, CT scan, and RT-PCR results, was isolated in an intensive care unit and developed pneumomediastinum and subcutaneous emphysema during hospitalization. The incidence of pneumomediastinum (which is often accidentally found on imaging in radiology) is rare, i.e. 1 in 32,896 cases in the general population.[12] Its pathophysiology is described by the Macklin phenomenon, which is an alveolar rupture caused by an enhanced pressure in alveolar space (by coughing, sneezing, vomiting, and labor). The potential causes of this problem are severe pulmonary infection, blunt or penetrating chest trauma, diagnostic interventions, illicit drug inhalation, as well as idiopathic causes.[22–25] It can be easily recognized by computed tomography of the thorax.[11]

In conclusion We have reported a case of COVID-19 pneumonia complicated by pneumomediastinum. Early Chest CT imaging allowed recognition of this complication which was treated with conservative supportive care.[26] Such care prevented further progression which was documented by follow-up CT that showed resolution of the pneumomediastinum.[12]

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