Pulmonary cavitation in COVID-19 pneumonia; is it primary or secondary?

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Abstract

A wide variety of chest computed tomography (CT) findings have been reported in patients with Covid-19 pneumonia. Pulmonary cavitation, although reported in a few cases of Covid19 pneumonia in the literature, is an uncommon finding to be identified in viral pneumonia and is considered among atypical CT features of Covid-19. In an attempt to adress to this issue, We want to emphasize the possibility of secondary infections in Covid-19, presenting with pulmonary cavitations as in our patient demonstrating a large sized pulmonary cavity when he was in intensive care unit (ICU).With consideration of a superinfection, bronchoscopy was performed and revealed growth of Acinetobacter in bronchoalveolar lavage (BAL) culture. As a result, secondary infections are common particularly in severely ill Covid-19 patients with much greater frequency in ICU. In cases of cavitary lesions superinfection should always be considered and accurate targetted treatment according to susceptibility testing should be started immediatelly, for better clinical outcomes.

Key words: Covid-19; SARS-CoV-2; Pulmonary cavity; Acinetobacter; Computed tomography

COVID-19 (coronavirus disease 2019) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first cases were seen in Wuhan, China on December 31st, 2019 and and recognized as a pandemic by the World Health Organization (WHO) on 11 March 2020.[1] The main mode of transmission is person to person spread via respiratory droplets during close contact. Clinical symptoms are often nonspecific and include mainly fever, dry cough, shortness of breath, fatigue, muscle and joint pain.[2] While most of the cases present with mild to moderate disease, some progress to severe pneumonia and acute hypoxemic respiratory failure. Moreover, as the pandemic progressed, extrapulmonary manifestations such as cerebral or cardiac involvement started to be increasingly recognised. The gold standart method of diagnosis is real-time reverse transcriptase-polymerase chain reaction (rRT-PCR) test on respiratory specimens, most frequently nasopharyngeal swabs or gene sequencing.[3] The rRT-PCR test is very specific, but the sensitivity is lower depending on specimen collection or viral burden at the time of sampling and the initial tests may be negative.[4] In addition, the results are not immediately available to allow quick assessment of the patients. Therefore, chest computed tomography (CT) plays an important role in the early diagnosis and management of the patients.. A wide variety of chest CT findings have been reported in patients with Covid-19 pneumonia. The most common and typical CT features are multifocal ground glass opacities (GGOs) reticulation (resulting in crazy paving pattern when superimposed on GGOs) and consolidations with peripheral/subpleural distribution, predominantly starting from middle and lower zones.[5,6] As the disease progress, increase in the extent of these main lesions may be accompanied by organizing pneumonia pattern which appears as development of irregula usually lineer consolidative opacities. In survival patients, this is followed by the resorption stage in which the infiltrations may be either totally absorbed or persist as areas of fibrosis, cystic formations.[7,8] Pulmonary cavitation, although reported in a few cases of Covid-19 pneumonia in the literature, it is an uncommon finding to be identified in viral pneumonia and is considered among atypical CT features of Covid-19.[9,10,11] In one of these reported cases, an obvious reduction in the size of the cavity with antiviral treatment has also been demonstrated.[9] In the other report, formation of small cavities during the recovery period in a patient whose two consecutive nucleic acid tests were negative, has been demonstrated.[10] In another patient with Covid-19 multiple cavitary lesions in both lungs has been reported and bronchoalveolar lavage (BAL) samples had no growth.[11] In an attempt to adress to this issue, we want to emphasize the possibility of secondary infections in Covid-19 patients, presenting with pulmonary cavitations as in my patient demonstrating a large sized pulmonary cavity when he was in intensive care unit (ICU). He was a 43 year old male with long history of smoking. He was diagnosed with Covid-19 by rRT-PCR test. His chest CT scan obtained from another center had been reported as characterized by peripheral GGOs

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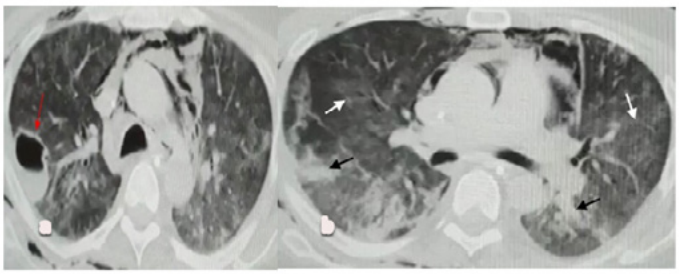
and consolidations. Upon deterioration of his clinical condition, he has been admitted to ICU and underwent intubation with invasive mechanical ventilation before the development of pulmonary cavitation. In ICU, a newly developped cavitary lesion was recognized on chest X-ray. With consideration of a bacterial superinfection, bronchoscopy was performed and revealed growth of Acinetobacter in BAL culture, which is a gram negative coccobacillus responsible for the necrotising pneumonia (cavitary lesion) in our patient (Figure 1). The organism has an ability to gain various resistance mechanisms leading to the emergence of new strains that are resistant to many kinds of available antibiotics.[12] Therefore, identification of secondary infections and treating the patient accordingly is important. Unfortunately, pneumomediastinum and subcutaneous emphysema has occured in our patient following bronchoscopy. His clinical status has been started to improve with the addition of antibiotics to which the organism is sensitive. In summary, secondary infections are common particularly in severely ill Covid-19 patients with much greater frequency in the ICU. In cases of cavitary lesions superinfection should always be considered and accurate targetted treatment according to susceptibility testing should be started immediatelly, for better clinical outcomes.

Figure 1: *Axial chest CT images of a 43 year old male with confirmed Covid-19, who was admitted on ICU. On follow-up, a cavitary lesion was recognized on chest X-ray and bronchoscopy was performed with growth of Acinetobacter in (BAL) culture, which was responsible for the necrotising pneumonia (cavitary lesion) (a, red arrow). Note the presence of GGOs (b, white arrows) and irregular consolidations (b, black arrows). Pneumomediastinum and subcutaneous emphysema following bronchoscophy is also visible.*



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