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COVID-19 and Crimean-Congo Hemorrhagic Fever: Similarities and Differences

Dear Editor,

The diagnosis of Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) infection, i.e., COVID-19, is confirmed with the patient's history, clinical manifestation, imaging characteristics as well as laboratory tests. Herein, high-resolution computed tomography (CT) has received much more attention in the diagnosis of COVID-19 particularly in polymerase chain reaction (PCR) negative patients. Multiple patchy ground-glass opacities (bilaterally and multi-lobular) with peripheral involvement are the typical CT findings.[1] However, the diagnosis can sometimes be challenging if the medical history is inconclusive. Besides, CT findings (patchy ground opacities) can be seen in various conditions such as heart failure, rheumatic diseases, interstitial lung disease, other types of viral pneumonia, and Crimean-Congo Hemorrhagic Fever (CCHF).[2] Herewith, after the novel coronavirus outbreak, the questions as regards "To whom should PCR tests or CT examination be administered?" and "How should the findings be interpreted?" remain a debate. Therefore, we deem it important to compare the CT findings of COVID-19 and CCHF. We believe that defining the similarities and differences of COVID-19 and CCHF will guide physicians particularly who are not familiar with the CCHF.

SARS-CoV-2 is an enveloped, positive-sense, and single-stranded RNA virus of ~30 kb, and is classified to *β coronaviruses*. On the other hand, the CCHF, caused by a single-strand enveloped RNA virus belonging to genus Nairovirus in the Bunyaviridae, is a zoonotic viral disease and is transmitted to people through a tick bite. However, transmission via the blood, secretions, organs, or other bodily fluids of infected persons can also be seen. The diagnosis can be quite challenging in patients without a history of a tick bite.[3] The overall mortality rate of CCHF ranges from 3% to 30% depending on the virus strain and epidemiological characteristics in various regions around the world.[2] CCHF has acute influences on several organs and can cause diffuse ecchymosis, internal bleeding, and impaired liver function. Main laboratory findings are consistent with leucopenia, thrombocytopenia, elevated liver enzymes, and prolonged bleeding profile. The release of cytokines, chemokines, and other pro-inflammatory mediators, leads to endothelial cell activation, endothelial damage, an increase in vascular permeability, activation of the coagulation system, and eventually disseminated intravascular coagulation.[3] Fever, malaise, nausea, vomiting, abdominal pain, myalgia,petechia, ecchymosis are common presentations of CCHF[3] whereas fever, dry cough, weakness and shortness of breath, loss of taste or smell are common symptoms of COVID-19.[4] Cytokine storm syndromes are important and also vital for increased morbidity and mortality in both diseases but have different outcomes. While CCHF results in hemorrhage, COVID-19 can cause thrombosis.[5]

The PCR tests are used for the diagnosis of both diseases. As for the imaging findings, direct invasion of pulmonary interstitial tissue by the CCHF virus has not been shown.[6] Although the appearance of ground-glass opacity is an important finding in the CCHF, it is seen due to alveolar hemorrhage and with pleural effusion and consolidation (Fig. 1).[6] On the other hand, most recent thoracic CT findings of SARS-CoV-2 comprises ground-glass opacity, consolidation,

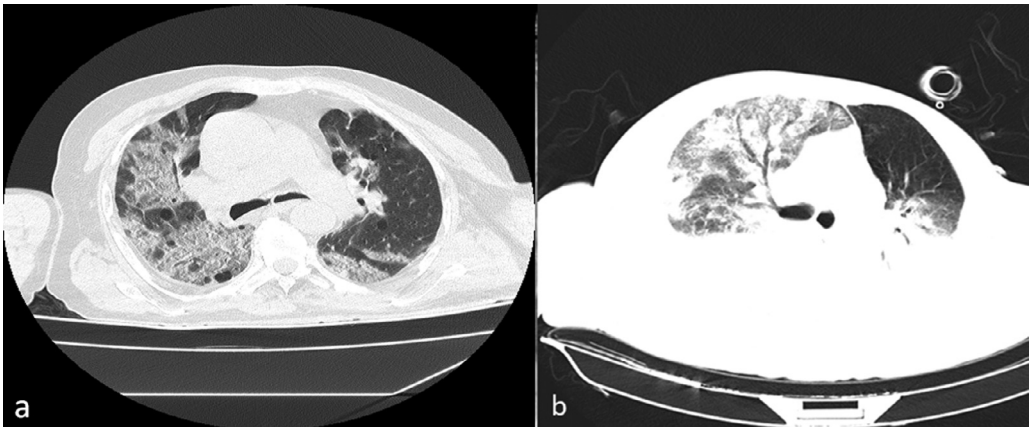

Fig. 1. Typical Computed Tomography Findings of CCHF and COVID-19 a-Ground-glass opacities, consolidation, crazy-paving pattern, and air bubbles in COVID-19 b-Ground-glass opacities, consolidation with air bronchograms, and bilateral pleural effusionin CCHF.

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crazy-paving pattern, air bronchogram, vascular enlargement, bronchial changesare and rarely pleural effusion, air bubble, and cavitary lesions. These findings often tend to be bilateral, peripheral, and dorsal, mostly in the middle, and lower zones and multilobular.[7]

In conclusion, we would like to underscore that CCHF should be kept in mind for the differential diagnosis of ground-glass opacity in endemic regions. Further studies comparing the immune mechanism of both diseases are awaited.

Declaration of Competing Interest

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