

Letters

CT Findings of Coronavirus Disease (COVID-19) Severe Pneumonia

A recent cluster of pneumonia caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in Wuhan, China, has spread elsewhere in China and all over the world [1]. Most patients present with mild symptoms, but some patients progress from having mild to severe disease. We report the CT features of a patient diagnosed with severe pneumonia from coronavirus disease (COVID-19) to help better understand the disease.

A 59-year-old woman from Wuhan was admitted to our hospital after experiencing 4 days of recurrent fever. Her highest body temperature was 38.8°C before admission, and this was accompanied by headache, dizziness, nausea, and vomiting, without chills, cough, or muscle soreness [2]. She had lived in Wuhan for many years and had a contact history of exposure to a patient infected with

SARS-CoV-2. Our patient also had a history of chronic gastritis. Before admission, the laboratory at the Guangzhou Centers for Disease Control and Prevention confirmed that the patient was infected with SARS-CoV-2 using the real-time reverse transcription–polymerase chain reaction test. The initial laboratory examination also revealed decreased WBC count ($3.06 \times 10^9/L$; normal range, $3.50\text{--}9.50 \times 10^9/L$) and decreased lymphocyte count ($0.68 \times 10^9/L$; normal range, $1.10\text{--}3.20 \times 10^9/L$). Chest CT showed bilateral ground-glass opacities that were considered to represent viral pneumonia (Fig. 1A). The patient was diagnosed with COVID-19 pneumonia using both the history and laboratory examination.

After admission, the patient had recurrent fever with a high temperature of 38.6°C accompanied by chills, cough with minimal white sputum, nasal congestion, chest dis-

tress, and shortness of breath after activity. A laboratory test showed that C-reactive protein (CRP) level elevated gradually, and WBC count and lymphocyte count decreased. Initially, the patient received antiviral and antiinfective treatment.

At 6 days after admission, the patient had marked shortness of breath, her blood oxygen saturation had dropped, and her oxygenation index was 169 (< 300). Chest CT showed multiple bilateral subsegmental peripheral patchy and ground-glass opacities with obscure boundaries and mainly subpleural distribution [3] (Fig. 1B). The SARS-CoV-2 nucleic acid test results were negative and CT showed diffuse consolidations in both lungs. Neither pleural effusions nor enlarged mediastinal lymph nodes were found. The bilateral lung lesions showed obvious progression and enlarged scope. The diagnosis was changed to severe COVID-19 pneumonia, and the patient was transferred to the ICU. Treatment was changed to high-frequency ventilation and administration of human immunoglobulin and teicoplanin immediately.

After 9–11 days, the patient's temperature went back to normal, but the patient had an aggravated cough and blood-tinged sputum. However, the CRP level had decreased, WBC count and lymphocyte count increased gradually, and moreover, the SARS-CoV-2 test was found to be negative. CT showed an enlarged lesion with increased attenuation. Some of the ground-glass opacities had turned into consolidations (Fig. 1C). The patient's symptoms were improving, whereas the imaging presentation worsened. The physician suspected a delay in change in imaging.

With a series of effective treatments, on days 12, 17, and 21 after admission, detection of SARS-CoV-2 by nucleic acid test from throat swabs was negative. Chest CT showed obvious absorption of the lesions and a subpleural line (Fig. 1D). The patient's symptoms improved, and the nucleic acid test was repeatedly negative for SARS-CoV-2, so the patient was released from quarantine and discharged.

In this case, we observed on chest CT the dynamic changes of severe COVID-19 pneumonia. At the early stage of disease, CT showed multiple patchy or ground-glass opacities with subpleural distribution in

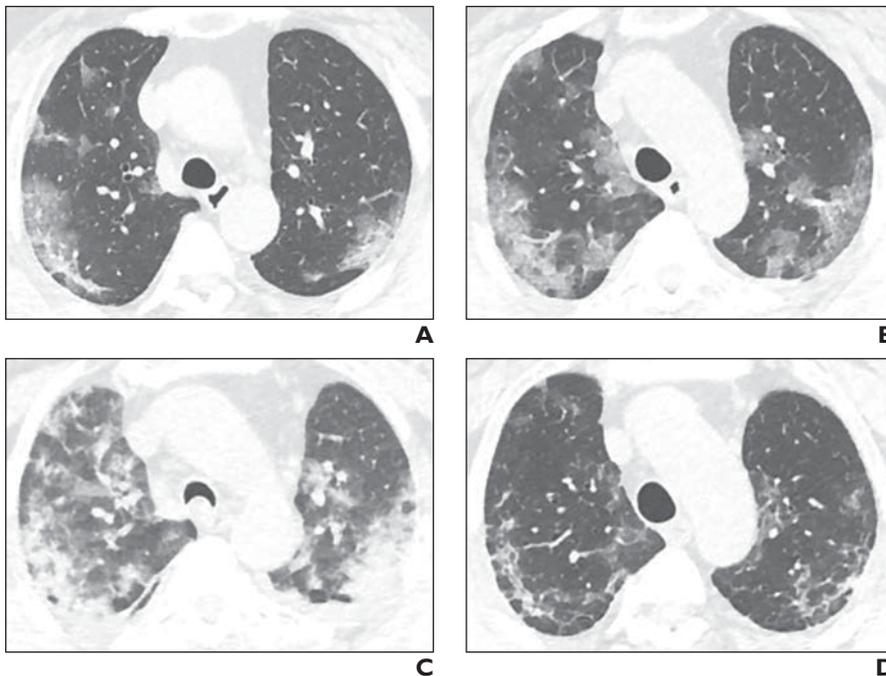


Fig. 1—59-year-old woman with coronavirus disease (COVID-19).

A, Initial unenhanced axial chest CT 4 days after admission shows multiple bilateral subsegmental peripheral patchy and ground-glass opacities with obscure boundaries and mainly subpleural distribution. Neither pleural effusion nor enlarged mediastinal lymph nodes are seen.

B and **C**, Unenhanced axial CT 6 (**B**) and 12 (**C**) days after admission and after initiation of treatment shows enlarged lesions; lesions of both lungs are diffuse and patchy compared with previous CT images.

D, Unenhanced axial CT 22 days after admission shows lesions in both lungs have absorbed gradually after treatment, and subpleural line can be seen.

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multiple bilateral lobes, which are the characteristic CT findings of COVID-19 pneumonia [4]. As pneumonia progressed, CT showed that the areas of lesions in the lungs enlarged and developed into diffuse consolidations in both lungs within a few days. Even when SARS-CoV-2 nucleic acid test results become negative and the patient's symptoms abated, there was a delay in the changes on CT and evidence of lesion absorption. During the absorption period, the patchy lung consolidations gradually absorbed and shrank, but the subpleural line was still present. A dynamic chest CT scan plays a very important role in the diagnosis and prognosis of SARS-CoV-2 infection.

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