


## CASE REPORT

# Changes of CT findings in a 2019 novel coronavirus (2019-nCoV) pneumonia patient

X. Fang<sup>1,\*</sup>, M. Zhao<sup>2,\*</sup>, S. Li<sup>1</sup>, L. Yang<sup>1</sup> and B. Wu<sup>1</sup> 

From the <sup>1</sup>Department of Radiology, West China Hospital, Sichuan University, Chengdu, China and <sup>2</sup>Department of Gastroenterology and Hepatology, West China Hospital, Sichuan University, Chengdu, China

\*These authors contributed equally to this work.

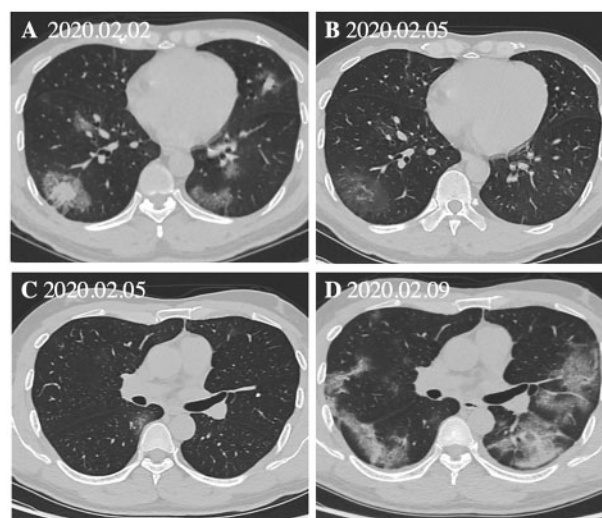
Address correspondence to Bing Wu, Department of Radiology, West China Hospital, Sichuan University, 37# Guoxue Road, Chengdu 610041, China. email: bingwu69@163.com

## Learning points for clinicians

The gold standard for diagnosis of 2019 novel coronavirus (2019-nCoV) infection is the new coronavirus nucleic acid in swabs, sputum, secretions from the lower respiratory tract or blood. However, due to the quite low sensitivity, short of supply and a relatively long period of new coronavirus nucleic acid kits, suspected cases with false-negative results remain a severe problem. Besides, a long incubation period (3–7 days, up to 14 days) and superior transmission capacity of new viruses contribute to the fast spread of 2019-nCoV. Under the circumstances, computed tomography imaging is not only useful for the detection, location of lesions but also helpful in the evaluation of the dynamic changes of patients with 2019-nCoV.

## Case presentation

A 47-year-old man had a history of cough, sputum production, sore throat and throbbing headache for 3 days without fever. He has been living in Chengdu, Sichuan province, for a long time. However, his mother had traveled to Wuhan a week ago and was diagnosed with the new coronavirus after she got back home. He has referred to the emergency department of our institution on 2 February 2020. General physical examination showed that moist rales were audible over both lungs, and the body temperature was 36.7°C, and other results were unremarkable. The laboratory tests showed that white blood cell count kept in the normal range ( $5.11 \times 10^9/l$ ), and the differential count showed decreased lymphocyte (16.8%, normal range



**Figure 1.** Chest CT images in a 47-year-old man. (A) CT images show that there are ground-glass opacities, consolidation or both in bilateral lungs, and 'halo sign' is visible in the basal segment of the lower lobe of the right lung. (B) The extent and density of lesions are significantly decreased. (C and D) At the third time of reexamination, CT scan shows multiple patchy ground-glass opacities, consolidation in bilateral lungs and the new lesions are in different locations.

20–50%) and increased C-reactive protein (22.50 mg/l; normal range <5 mg/l). Chest computed tomography (CT) (2 February 2020) showed that there were ground-glass opacities, consolidation or both in bilateral lungs (Figure 1A). Considering the contact history with his mother and the CT features, a real-time fluorescence polymerase chain reaction of the patient's throat

Received: 13 February 2020

© The Author(s) 2020. Published by Oxford University Press on behalf of the Association of Physicians. All rights reserved.

For permissions, please email: journals.permissions@oup.com

swab was performed, and the patient was confirmed with 2019 novel coronavirus (2019-nCoV) infection.

After receiving 3 days of treatment with an antiviral (Veletonavir), and anti-inflammatory (Methylprednisolone), the patient's cough was relieved, and repeated chest CT (5 February 2020) showed the extent and density of lesions were significantly decreased (Figure 1B). Laboratory tests, however, showed that lymphocytes were still reduced, and erythrocyte sedimentation rate was increased.

On 6 February 2020, the patient began to have a fever (body temperature 38.6°C) then additional antibiotics (Piperacillin-tazobactam) was given. Unfortunately, 2 days later, the patient's body temperature reached a maximum of 39.0°C, accompanied by a paroxysmal cough, and the whole body's skin was flushing. CT images (9 February 2020) manifested as extensive ground-glass opacities, consolidation in bilateral lungs. Oddly, compared with CT images of the last two times (Figure 1C), all the lesions were found in different locations (Figure 1D). On 11 February 2020, he received a real-time fluorescence polymerase chain reaction of the throat swab again, and the results were still positive.

## Discussion

An unknown respiratory illness emerged and spread in Wuhan City, Hubei province of China, in December 2019. The initial symptoms of the affected patients include fever, cough or muscle weakness.<sup>1</sup> Soon after, the Chinese Center for Disease Control and Prevention (CDC) reported that the respiratory illness was caused by a novel coronavirus, which named '2019 Novel Coronavirus (2019-nCoV)' by the World Health

Organization (WHO).<sup>2</sup> Unfortunately, it has spread rapidly to all other parts of China in the past 2 months. By 13 February 2020, there were 59 804 confirmed cases in China, 13 435 suspected cases, 1367 deaths and 5911 discharged patients.

In this case, during the patient hospital stay, both two times of nucleic acid tests were positive. According to repeated CT scans, the patient's condition seemed to get improvement but somehow deteriorated suddenly. It is suggested that the condition of patients infected by 2019-nCoV can be waved and lingering. Under the circumstances, CT imaging is not only useful for the detection, location of lesions but also helpful in the evaluation of the dynamic changes of patients with 2019-nCoV. In summary, CT imaging can play a determinant role in clinical decision-making.

*Conflict of interest:* The authors have no potential conflicts of interest to disclose.

## References

1. Wuhan Municipal Health Commission. Report of Clustering Pneumonia of Unknown Etiology in Wuhan City. 2019. <http://wjw.wuhan.gov.cn/front/web/showDetail/2019123108989> (25 January 2020, date last accessed).
2. WHO. *Clinical Management of Severe Acute Respiratory Infection When Novel Coronavirus (nCoV) Infection is Suspected: Interim Guidance*. 2020. [https://www.who.int/internalpublications-detail/clinical-management-of-severe-acute-respiratoryinfection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/internalpublications-detail/clinical-management-of-severe-acute-respiratoryinfection-when-novel-coronavirus-(ncov)-infection-is-suspected) (21 January 2020, date last accessed).