



Cardiothoracic Imaging

COVID-19 pneumonia patient without clear epidemiological history outside Wuhan: An analysis of the radiographic and clinical features

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ABSTRACT

The purpose of this case report is to describe the radiographic and clinical features of a COVID-19 pneumonia patient without clear epidemiological history outside Wuhan, China.

1. Introduction

In December 2019, unexplained pneumonia was found in Wuhan, China, and the disease spread rapidly around the country. The virus responsible for this disease [1] has been identified as a novel coronavirus, named by the International Committee on Taxonomy of Viruses (ICTV) on February 11, 2020, as the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). As of March 9, 2020, there were 80,906 laboratory-confirmed cases in China, more than 10,000 of which are from outside of Hubei. Almost all confirmed cases had a clear epidemiological history. The purpose of this case report is to describe the radiographic and clinical features of a COVID-19 pneumonia patient without clear epidemiological history outside Wuhan, China.

2. Case report

A 66-year-old woman was transferred to our hospital in Lanzhou, China (1005 miles from Wuhan), for high resolution computed tomography (HRCT). The image showed ground glass opacities (GGOs) in both lungs. The patient's novel coronavirus nucleic acid test returned positive on January 30, 2020. The patient was a retired worker in good health and did not have diabetes, hypertension, or cardiovascular

disease, and there was no history of smoking. Three days before admission, she experienced coughing, fatigue, sputum production and dyspnea after activities. Her body temperature was normal. The specialist examination revealed thick breath sounds in both lungs and a few wet pulmonary rales. Laboratory tests showed elevated levels of white blood cells (10.7 ; normal range $4-10 \times 10^9/L$) and neutrophils (8.6 ; normal range $2.0-7.0 \times 10^9/L$). The neutrophil ratio was high (80 ; normal range $50-70\%$), while the lymphocyte ratio was low (12.70 ; normal range $20-40\%$). C-reactive protein (38.55 ; normal range $2-8 \text{ mg/L}$) and lactate dehydrogenase (263 ; normal range $115-220 \text{ U/L}$) were elevated. D-dimer, myoglobin, and troponin were normal. Complications of acute respiratory distress syndrome, acute cardiac injury, and secondary infection were not evident. It is worth noting that the patient had no record of contact with confirmed patients, had no travel history in recent months, and did not visit other cities, including Wuhan.

On the second day of admission (January 31, 2020), the patient's HRCT showed GGOs distributed in multiple lobes and segments of both lungs, which were more obvious under the pleura, with thickened interlobular septa in the lesion (Fig. 1A and B). Two days later (February 2, 2020), the CT images revealed relatively little change in the lesion, with only a few lesions showing a slight increase in density (Fig. 1C and

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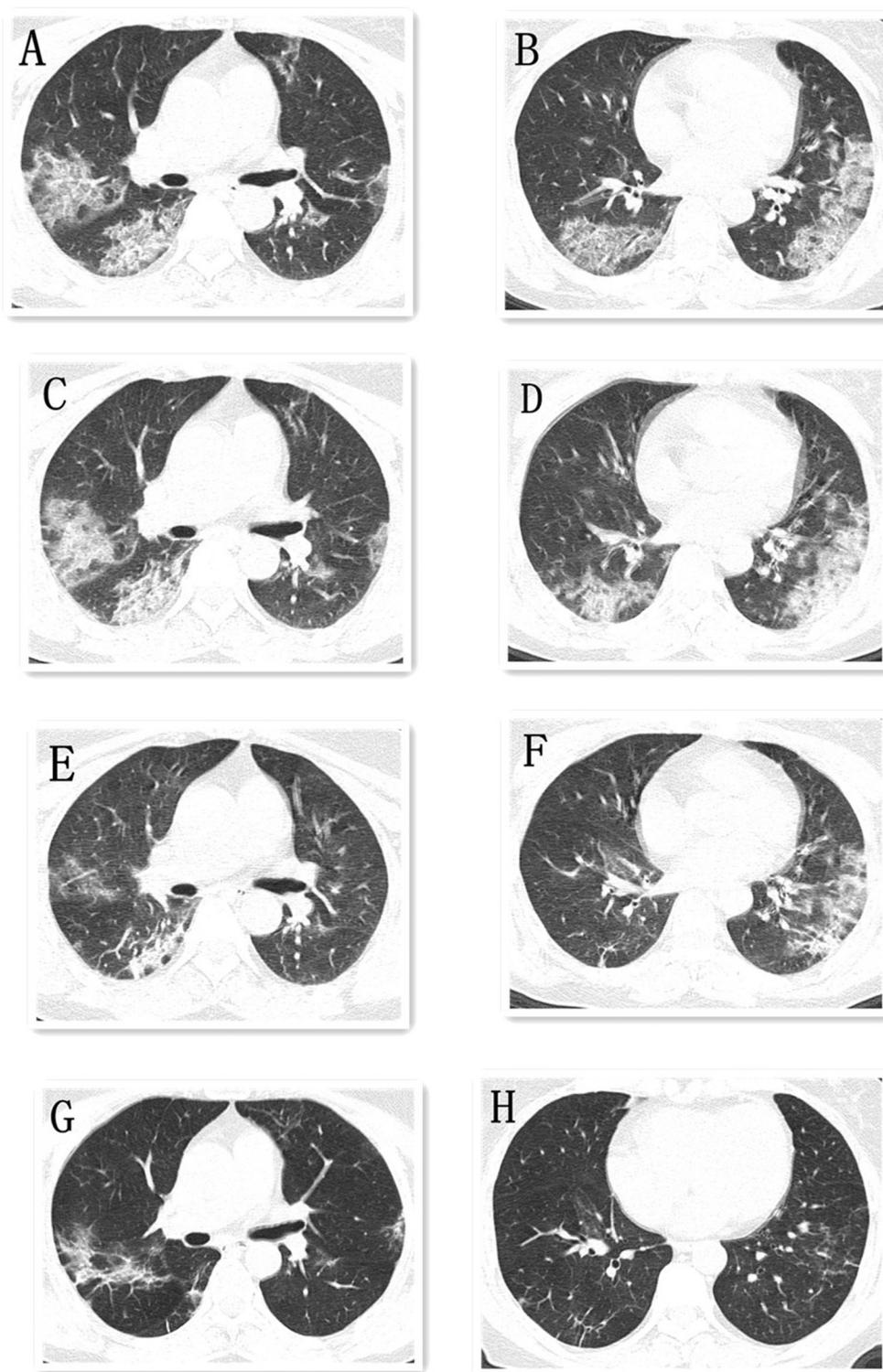


Fig. 1. A and B) HRCT image obtained on the second day of admission (January 31, 2020), showed GGOs distributed in multiple lobes and segments of both lungs. C and D) CT images revealed little change in the lesion (February 2, 2020). E and F) The patient's bilateral pulmonary lesions improved and a little fibrous stripe was evident (February 6, 2020). G and H) Follow-up images after discharge; lesion absorption was more obvious (February 18, 2020).

D).

During hospitalization, the patient was treated with oral antiviral drugs (lopinavir and ritonavir tablets, 400 mg twice daily), interferon (50 μ g twice daily), and methylprednisolone (50 mg twice daily), combined with oxygen therapy. In addition, the patient was given antibiotics (moxifloxacin hydrochloride and sodium chloride injection) and gastric mucosa protectants (omeprazole). After 7 days of treatment

(February 6, 2020), the patient's HRCT showed that her bilateral pulmonary lesions had improved and a little fibrous stripe was evident (Fig. 1E and F). Her novel coronavirus nucleic acid tests demonstrated 2 consecutive negative results (February 7, 2020 and February 9, 2020). Medications were stopped and the patient was discharged on February 10, 2020. She was subsequently isolated at home for 14 days. HRCT images obtained after discharge (February 18, 2020) showed that lesion

absorption was more obvious (Fig. 1G and H).

3. Discussion

The aim of this case report was to describe the radiographic and clinical features of a patient with COVID-19 pneumonia outside Wuhan, who had no clear epidemiological history. To the knowledge of the authors, this is the first reported case without clear epidemiological history. Most patients with COVID-19 have a clear history of exposure, or travel, and residence in Wuhan. The patient described in this case report had no clear epidemiological history and has likely been exposed to the virus without her knowledge, hence she can be referred to as “second-generation patients”.

The patient had similar radiographic and clinical findings to previously reported cases in the literature, but there were some differences. Current research demonstrated that the most common HRCT features of COVID-19 pneumonia are patchy/punctate ground glass opacities (85.7%), patchy consolidation (19.0%) that is mainly distributed in a sub-pleural area, and the presence of fibrous stripes after the patient's condition improves [2]. The HRCT images of this patient demonstrated almost all of these features. A recent retrospective study found that radiographic findings from chest CT were most severe on day 10 of initial symptom onset and began to improve on day 14 of initial symptom onset [3]. The findings from this patient's chest CT were typical of those with COVID-19. For this patient, recovery was earlier than usual. In contrast, most patients with COVID-19 present with fever (98%), cough (76%), and myalgia or fatigue (44%). Fever is the most common feature [4]. The patient described in this case report had no

fever onset, which has not been reported previously in patients with respiratory symptoms and CT abnormalities.

In conclusion, this case report aimed to communicate and educate radiologists and clinicians in the recognition of this new disease. Clinicians need to be vigilant; even patients with respiratory symptoms, without a history of exposure or fever, should be examined radiographically using HRCT. Moreover, timely nucleic acid testing should be performed when radiographic findings present similarly to those of patients with COVID-19.

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References

- [1] Benvenuto D, Giovanetti M, Ciccozzi A, Spoto S, Angeletti S, Ciccozzi M. The 2019-new coronavirus epidemic: evidence for virus evolution. *J Med Virol* 2020;92(4):455–9.
- [2] Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020;395(10223):497–506.
- [3] Pan F, Ye T, Sun P, et al. Time course of lung changes on chest CT during recovery from 2019 novel coronavirus (COVID-19) pneumonia. *Radiology* 2020:200370.
- [4] Kanne JP. Chest CT findings in 2019 novel coronavirus (2019-nCoV) infections from Wuhan, China: key points for the radiologist. *Radiology* 2020:200241.