

Rehospitalization of a Recovered Coronavirus Disease 19 (COVID-19) Child With Positive Nucleic Acid Detection

Haizhou Wang, MD,* Ying Li, MD,† Fan Wang, MD,* Hui Du, MD,† and Xiaoxia Lu, MD†

Abstract: Since December 2019, novel coronavirus-infected pneumonia (coronavirus disease 19) occurred in Wuhan and rapidly spread throughout China and beyond. During this period, increasing of reports found that several recovered patients from different hospitals showed positive results of nucleic acid test again soon after discharge. However, little attention has been paid to recovered children. Herein, we reported a case of 8-year-old recovered child, who was rehospitalized again because of unexplained fever.

Key Words: coronavirus disease 19, children, postdischarge surveillance, nucleic acid test

(*Pediatr Infect Dis J* 2020;XX:00–00)

Previous studies focused on the epidemiology and clinical characteristics of adult patients diagnosed with coronavirus disease 2019 (COVID-19).^{1,2} There was also a growing emphasis on the follow-up of recovered COVID-19 patients.³ However, little attention has been paid to recovered children.

METHODS

In China, the most current criteria for the discharge of patients or discontinuation of quarantine for COVID-19 patients are (1) body temperature normal for 3 days, (2) significant improvement of respiratory symptoms, (3) significant improvement in chest computed tomography (CT) and (4) 2 consecutive negative nucleic acid test (NAT) (interval > 24 hours) by real-time reverse transcriptase-polymerase chain reaction for the sputum, nasopharyngeal swabs and other respiratory samples. After discharge, the patients are required to quarantine and health monitor for 14 days and are suggested to have follow-up and further consultation within 2–4 weeks.⁴ For those children with positive virus detection during this period in our institution, we extracted and analyzed their medical records.

This study was approved by the ethics committee of Wuhan Children's Hospital (Number 2020003). Informed consent was also obtained from patient's parents.

CASE

This case was an 8-year-old boy with an exposure history to a suspected COVID-19 grandmother. He experienced intermittent fever (up to 39.5°C) beginning 2 February. Chest CT showed ground-glass changes in the lower left lobe on 5 February, and throat

swab test was positive on 6 February (Fig. 1A). He was admitted to our hospital on 7 February. During the hospitalization from 7 to 19 February, his temperature gradually decreased to normal levels after antiviral and symptomatic treatment. Throat swab NATs were positive on 9 and 13 February and turned negative on 16 and 17 February.

After discharge on 19 February, this boy was kept under surveillance and quarantined at home. However, the child developed unexplained fever on 29 February up to 38.6°C and was admitted into our hospital again on 1 March. A chest CT showed disappearance of previous abnormalities (Fig. 1B). During the second hospitalization, his temperature rose to 40.4°C and returned to normal levels on 5 March. The results of throat swab tests were negative on 3 March, while positive on 5 March. The serum antibody test also had weakly positive result of immunoglobulin M and strong positive result of immunoglobulin G on 6 March.

DISCUSSION

Recently, it was reported that 14% of adult patients from different hospitals showed positive results of NAT soon after discharge.⁵ This aroused concern that these recovered patients were potential carriers of the virus.

In this case, the patient showed typical clinical and radiological manifestations on first admission and met discharge standards after treatment. After 10 days, he developed fever again and was admitted to the hospital for the second time. The fever was quickly brought under control. No abnormalities were found in CT images, while the results of 2 NATs were negative and positive, respectively. This was slightly different from the reported "recurrent" adult cases.³ During the quarantine period, the adult recovered patients continued to be asymptomatic.

This case also indicated that children who recovered clinically might still carry a small amount of virus which was hard to detect. After reaching the discharge criteria, it may still take several days for the immune system to completely clear the virus from the body. This may explain why the novel coronavirus was also found in anal swabs in the later stages of infection, and the positive rate was higher than that in throat swabs.⁶ While it is possible that our case represents a reactivation, it is also possible that symptoms in this "recurrent" child may be caused primarily by other diseases.

CONCLUSION

Similar to adults, recovered children with COVID-19 may also have positive results of nucleic acid detection after discharge. Differential diagnosis of common diseases in children should also be undertaken if this occurs especially if there is no evidence of pulmonary pathology. The study was limited because it was only a case report. Longitudinal studies with more children will help to understand the impact of the COVID-19 on children's prognosis.

REFERENCES

1. Wang D, Hu B, Hu C, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA*. 2020;323:1061–1069.
2. Chan JF, Yuan S, Kok KH, et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. *Lancet*. 2020;395:514–523.

Accepted for publication March 23, 2020.

*Department of Gastroenterology, Zhongnan Hospital of Wuhan University, Wuhan, China; and †Department of Respiratory Medicine, Wuhan Children's Hospital, Wuhan, China.

Haizhou Wang and Ying Li contributed equally to this work.

The work was supported by the Program of Excellent Doctoral (Postdoctoral) of Zhongnan Hospital of Wuhan University (Grant No. ZNYB2019003).

The authors have no conflicts of interest to disclose.

Address for correspondence: Xiaoxia Lu, MD, Department of Respiratory Medicine, Wuhan Children's Hospital, 100 Hongkong Road, Jiangnan District, Wuhan, Hubei, China. E-mail: lusi74@163.com.

Copyright © 2020 Wolters Kluwer Health, Inc. All rights reserved. ISSN: 0891-3668/20/XXXX-0000

DOI: 10.1097/INF.0000000000002690

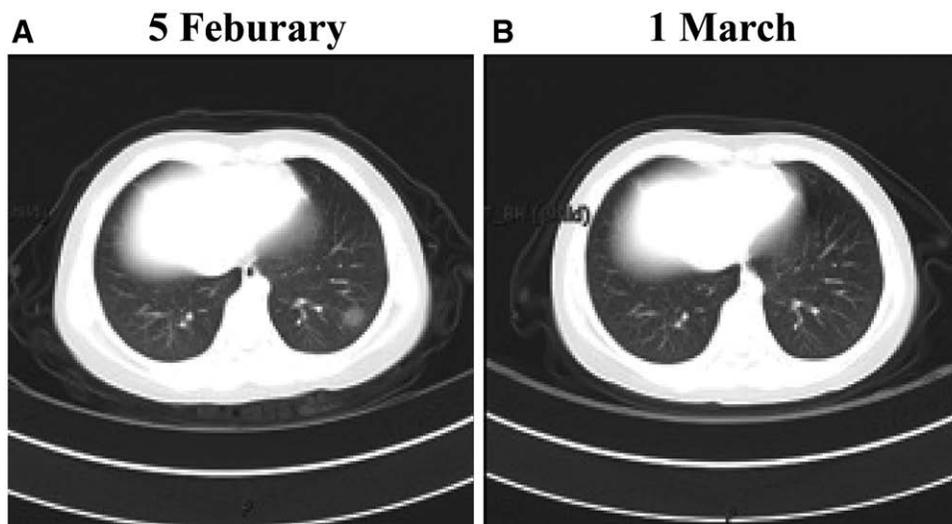


FIGURE 1. Changes in chest computed tomography images during two admissions of this patient. (A) First and (B) second.

3. Lan L, Xu D, Ye GM, et al. Positive RT-PCR test results in patients recovered from COVID-19. *JAMA*. February 27, 2020. [Epub ahead of print].
4. National Health Commission of China. New coronavirus pneumonia prevention and control program (7th ed). 2020. Available at: <http://www.nhc.gov.cn/yzygj/s7653p/202003/46c9294a7dfe4cef80dc7f5912eb1989.shtml?spm=C73544894212.P59511941341.0.0>. Accessed March 5, 2020.
5. Zhou L, Liu K, Liu HG. Cause analysis and treatment strategies of “recurrence” with novel coronavirus pneumonia (COVID-19) patients after discharge from hospital. *Zhonghua Jie He He Hu Xi Za Zhi*. 2020;43:E028.
6. Zhang W, Du R, Li B, et al. Molecular and serological investigation of 2019-nCoV infected patients: implication of multiple shedding routes. *Emerg Microbes Infect*. 2020;9:386–389.