Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Letter to the Editor

SARS-CoV-2 positivity in a discharged COVID-19 patient: a case report

J. Li [1, 2, †], X. Long [3, †], X. Fang [1, †], Q. Zhang [1, †], S. Hu [4, **], Z. Lin [5, §], N. Xiong [1, 2, §, *]

[1)] *Medical Treatment Expert Group for COVID-19, Wuhan Red Cross Hospital, Wuhan, Hubei, China*
[2)] *Department of Neurology, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, China*
[3)] *Department of Radiology, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, China*
[4)] *Department of Radiology, Wuhan Red Cross Hospital, China*
[5)] *McLean Hospital, Harvard Medical School, Belmont, MA, USA*

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More than 60 000 patients infected with severe acute respiratory syndrome–related coronavirus 2 (SARS-CoV-2) have recovered and been discharged since the outbreak of coronavirus disease 2019 (COVID-19) in Wuhan, China. Occurrence of positive reverse transcription (RT) PCR results for the presence of SARS-CoV-2 can be seen in healthy, culture-negative COVID-19 patients even weeks after complete recovery.

A 50-year-old man with a history of 6-year hypertension and diabetes was admitted to our hospital with a 9-day fever and cough. His body temperature at its highest was 38.5°C. The laboratory examinations revealed a lower degree of lymphocyte percentage and increased levels of C-reactive protein and fibrinogen, also with prolonged prothrombin time and activated partial thromboplastin time. At admission, nasopharyngeal swab specimens from the upper respiratory tract were quickly obtained, and he was confirmed as having COVID-19 when the RT-PCR tests of the specimens for presence of the SARS-CoV-2 RNA (Daan Geen, Sun Yat-sen University) were positive on illness day 13. After a period of exhibiting symptoms and initiating antiviral treatment, including ganciclovir (250 mg intravenous drip once a day) and ribavirin (500 mg intravenous drip twice a day), he met the Chinese guideline criteria for hospital discharge (absence of clinical symptoms, substantially improved acute exudative lesions on chest computed tomographic images and two consecutively negative RT-PCR test results separated by at least 1 day [1]) on illness day.

20. After hospital discharge, the patient was asked to continue the quarantine protocol at home for at least 2 weeks. However, similar to what has been reported recently [2], this patient had two positive RT-PCR test results again on illness days 34 and 38 (post-discharge retesting was a policy of the Chinese government [1]). He was thus rehospitalized. This time he was asymptomatic, and his chest computed tomographic scans showed improvement of original lesions, with only a few ground-glass opacities (Fig. 1). We ran viral antibody tests on illness day 40 and got positive results (Innovita Biotechnology Company, Chengdu Precision Medicine Industrial Technology Research Institute, West China). The positive results of both immunoglobulin M and immunoglobulin G from this patient helped us confirm the diagnosis of SARS-CoV-2 infection [3]. He has been given further therapies, such as Chinese herbal medicines, to enhance his immunity until the RT-PCR result from nasopharyngeal swabs becomes consecutively negative twice at the time of discharge.

One of the reasons for SARS-CoV-2 reappearance was two false-negative results in the before-discharge RT-PCR tests, given the potentially limited detection sensitivity [4,5], so that residual virus genome might have remained in the patient's unrecovered lung. By using the same sampling and detection methods with the same detection sensitivity and in the same individual, it turned positive days later. Another reason for this turning from double-negative results to positive results was that the virus might be able to regrow to a detectable level [2]. Additionally, this might be due to the biological characteristics of SARS-CoV-2 and might also be related to coexisting diseases, clinical status, glucocorticoid therapy, sampling method, sample processing or even SARS-CoV-2 reinfection of this patient [6]. It is unknown whether the repeated PCR positivity should be considered as evidence for virus alive because a virus culture was not

* Corresponding author. N. Xiong, Department of Neurology, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, 1227 Jiefang Ave, Wuhan, Hubei, China.
** Corresponding author. S. Hu, Department of Radiology, Wuhan Red Cross Hospital, 392 Hongkong Road, Wuhan, Hubei, China.
E-mail addresses: 18062518869@163.com (S. Hu), nianxiong@hust.edu.cn (N. Xiong).
† The authors J. Li, X. Long, X. Fang, Q. Zhang contributed equally to this article.
§ The authors Z. Lin, N. Xiong contributed equally to this article, and both should be considered senior author.

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performed. In other words, whether the patient was still contagious remains unclear because the patient had no chance to show infectivity.

In order to prevent further transmission, discharged patients must undergo a 14-day quarantine and close follow-up at home or in a centralized rehabilitation institution of the city of Wuhan, according to Chinese government policies [1]. We strongly suggest that such a quarantine be applied worldwide to contain the rapid spread of COVID-19.

Transparency Declaration

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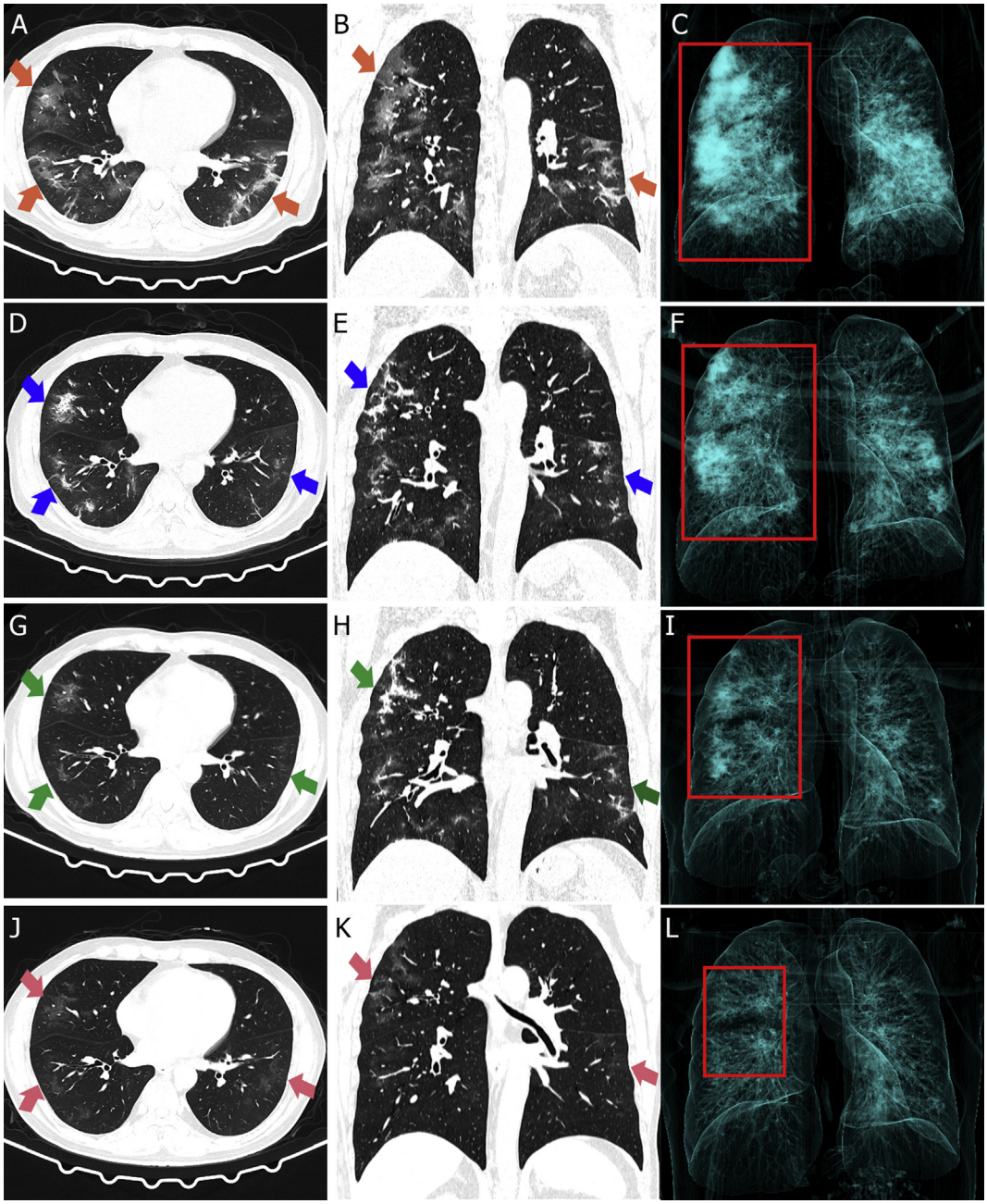

Fig. 1. Time course of chest computed tomographic (CT) scan findings in a 50-year-old patient with COVID-19 (A–F, before discharge; G–I, after discharge; J–L, rehospitalized; and first column, axis scans; second column, coronal scans; third column, three-dimensional reconstruction). (C) Illness day 10 CT images revealed sporadic bilateral patchy ground-glass opacification with air bronchogram sign (orange arrows). Adjacent pleura was thickened without pleural fluid. (D–F) Illness day 16 (at hospital discharge) images showed increase of ground-glass opacities with a higher density and fiber stripes (blue arrows). (G–I) At 18 days' follow-up after discharge (illness day 34), reverse transcriptase PCR indicated positive again, while CT findings showed improvement of original lesion with a few ground-glass opacities (green arrows). (J–L) Thirteen days after rehospitalization (illness day 47); red arrows indicate further improvement of original lesions.

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