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LETTER TO THE EDITOR



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To the Editor,

In early December 2019, a novel coronavirus (SARS-CoV-2) was identified in Wuhan. It has been named COVID-19 and to date it has spread to more than 120 countries. It has become a global pandemic. There are great challenges in disease control and prevention, for the three following reasons. First, asymptomatic and symptomatic patients likewise are capable of spreading COVID-19 (1). Second, the viral loads of asymptomatic and symptomatic patients are similar, which means they are equally effective in spreading COVID-19. Third, it is unclear how long is the SARS-CoV-2 viral duration in upper respiratory specimens of infected patients. It was reported that following a positive diagnosis, on average, patients will cease to be tested positive after 21 days (2).

In this retrospective study, we examined the hospital records of 24 COVID-19 patients who had been discharged according to the National Health Commission discharge guidelines: two consecutive negative throat swabs and one negative rectal swab (3). The median duration of viral shedding was 12.0 days (IQR, 9.0–14.0). The shortest during of viral shedding was 4 days, and the longest in our cohort is 34 days. In a recent study, Zhou and colleagues reported the median duration of viral shedding was 20.0 days in survivors, the longest was 37 days (4). Here we report this particularly long infection case of COVID-19.

A 47-year-old man was presented to clinic on 25 January with mild cough but no fever or diarrhoea. He was previously healthy. He was believed to have caught the virus after having a meal with friends who came from Wuhan on 21 January. He was diagnosed as COVID-19 positive and was transferred to isolation ward on 2 February. Results of blood test were as follow: white blood cell $6.36 \times 10^9/L$, neutrophil $4.2 \times 10^9/L$, lymphocytes $1.6 \times 10^9/L$, platelet $155 \times 10^9/L$, C-reactive protein 0.71 mg/L, aspartate transaminase (AST) 40 U/L, and alanine aminotransferase (ALT) 19 U/L. He was

treated with Kaletra (Lopinavir/Ritonavir), Umifenovir, Linghua-Qingwen capsules, and α -interferon spray. His cough was relieved and did not have any other symptoms. Over the 34 days he was hospitalized, he was tested viral nucleic acid 22 times using the reverse transcription–polymerase chain reaction (RT-PCR), 17 of which were of throat swabs and 5 of which were of rectal swabs (shown in Table 1). We have used two types of test kits, manufactured by two companies based in Shanghai, GeneoDx (Cat. No. 20202655) and LifeRiver (Cat. No. Z-RR-0479-02-25). All samples were taken by well-trained nurses. Polyester flock swabs were used for collecting all samples. Although this patient had been treated by multiple antiviral drugs and did not take any corticosteroid, his RT-PCR still lasted 34 days positive. Thus, how long could the SARS-CoV-2 stay in human body following a COVID-19 is still largely unknown.

As a novel coronavirus, the pathogenesis of SARS-CoV-2 are still being worked out. Viral replication and clearance are decided by body defence mechanisms. Adaptive immune response is responsible for viral clearance *via* stopping viral replications (5). CD4+ T cells perform a crucial role in promoting effective B cell response during infection and facilitate the production of antibody. On the other hand, CD8+ T cells clean out the cells that are infected with SARS-CoV (6). Therefore, we believe that this patient's virus clearance capacity is below average and worthy of being reported in a medical journal.

There has been reports of patients who had recovered and were allowed to discharge from hospitals, who were then tested positive again with the RT-PCR test during the medical observation period that follows discharge. According to the latest version of China's guidelines (3), following discharge, the patients should stay isolated and remain under close medical observation by physicians for 14 days. The discharged patient should wear face mask when interact with others, live in a

Table 1. Cycle threshold (Ct) values of the longest duration SARS-CoV-2 infection.

Samples	Throat swabs (Ct value) ^a				Rectal swabs (Ct value) ^a				
	Date	N	RdRP	E	Housekeeper	N	RdRP	E	Housekeeper
Feb 12	33.26	Neg	ND	ND	ND	ND	ND	ND	ND
Feb 14	Neg	Neg	ND	ND	ND	ND	ND	ND	ND
Feb 15	32.14	Neg	ND	ND	ND	ND	ND	ND	ND
Feb 16	ND	ND	ND	ND	33.19	33.41	32.49	32.07	
Feb 19	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg
Feb 20	36.57	36.48	35.98	30.66	ND	ND	ND	ND	ND
Feb 22	38.33	38.67	37.75	29.53	ND	ND	ND	ND	ND
Feb 25	35.16	35.28	34.89	29	Neg	Neg	Neg	Neg	Neg
Feb 27	35.91	35.68	35.23	28.18	ND	ND	ND	ND	ND
Feb 29	31.31	31.52	31.73	28.29	ND	ND	ND	ND	ND
Mar 1	37.85	38.28	36.92	27.45	Neg	Neg	Neg	Neg	Neg
Mar 2	37.03	38.22	36.99	25.2	ND	ND	ND	ND	ND
Mar 3	37.62	37.66	37.11	27.79	ND	ND	ND	ND	ND
Mar 4	35.86	37.00	35.86	26.96	ND	ND	ND	ND	ND
Mar 5	Neg	Neg	Neg	Neg	ND	ND	ND	ND	ND
Mar 6	39.67	39.41	38.05	27.51	ND	ND	ND	ND	ND
Mar 7	Neg	Neg	Neg	Neg	ND	ND	ND	ND	ND
Mar 8	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg

^aFeb 12–16 RT-PCR kits from GeneDx of Shanghai (SKU: 20202655); Feb 19–Mar 8 RT-PCR kits from LifeRiver of Shanghai (SKU: Z-RR-0479-02-25). Neg: negative; ND: non-detected; N: RdRP, and E gene of SARS-Cov-2.

well-ventilated single room, avoid close contact with family members, do not share meals with others, wash their hands frequently, and avoid leaving their room.

Ethics approval

The study has been reviewed and approved by the Medical Ethical Committees (2020-R018).

Disclosure statement

The authors declare that they have no competing interests.

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