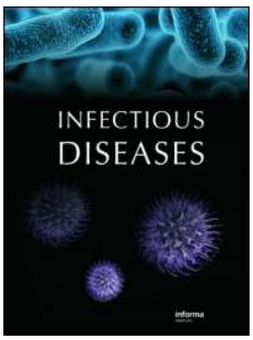

Infectious Diseases

ISSN: 2374-4235 (Print) 2374-4243 (Online) Journal homepage: https://www.tandfonline.com/loi/infd20

Duration of SARS-CoV-2 viral shedding during COVID-19 infection

Guo-Qing Qian, Xue-Qin Chen, Ding-Feng Lv, Ada Hoi Yan Ma, Li-Ping Wang, Nai-Bin Yang & Xiao-Min Chen

To cite this article: Guo-Qing Qian, Xue-Qin Chen, Ding-Feng Lv, Ada Hoi Yan Ma, Li-Ping Wang, Nai-Bin Yang & Xiao-Min Chen (2020): Duration of SARS-CoV-2 viral shedding during COVID-19 infection, Infectious Diseases, DOI: 10.1080/23744235.2020.1748705

To link to this article: https://doi.org/10.1080/23744235.2020.1748705

Published online: 10 Apr 2020.

Taylor & Francis
Taylor & Francis Group

INFECTIOUS DISEASES,
2020; VOL. 0,
NO. 0, 1–2

https://doi.org/10.1080/23744235.2020.1748705

LETTER TO THE EDITOR

Duration of SARS-CoV-2 viral shedding during COVID-19 infection

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 6.36×10^9/L, neutrophil 4.2×10^9/L, lymphocytes 1.6×10^9/L, platelet 155×10^9/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 pathogeneses 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
Feb 14	Neg	Neg	ND	ND	ND	ND	ND	ND
Feb 15	32.14	Neg	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
Feb 20	36.57	36.48	35.98	30.66	ND	ND	ND	ND
Feb 22	38.33	38.67	37.75	29.53	ND	ND	ND	ND
Feb 25	35.16	35.28	34.89	29	Neg	Neg	Neg	Neg
Feb 27	35.91	35.68	35.23	28.18	ND	ND	ND	ND
Feb 29	31.31	31.52	31.73	28.29	ND	ND	ND	ND
Mar 1	37.85	38.28	36.92	27.45	Neg	Neg	Neg	Neg
Mar 2	37.03	38.22	36.99	25.2	ND	ND	ND	ND
Mar 3	37.62	37.66	37.11	27.79	ND	ND	ND	ND
Mar 4	35.86	37.00	35.86	26.96	ND	ND	ND	ND
Mar 5	Neg	Neg	Neg	Neg	ND	ND	ND	ND
Mar 6	39.67	39.41	38.05	27.51	ND	ND	ND	ND
Mar 7	Neg	Neg	Neg	Neg	ND	ND	ND	ND
Mar 8	Neg	Neg	Neg	Neg	Neg	Neg	Neg	Neg

[a]Feb 12–16 RT-PCR kits from GeneoDx 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.

Funding

This work was supported by the Natural Science Foundation of Zhejiang Province [Q17H010001], Natural Science Foundation of Ningbo [2017A610246], Medical and Health Technology Development Programme in Zhejiang Province [2017KY573].

References

[1] Qian GQ, Yang NB, Ding F, et al. Epidemiologic and clinical characteristics of 91 hospitalized patients with COVID-19 in Zhejiang, China: a retrospective, multi-centre case series. QJM. 2020.

[2] Zou L, Ruan F, Huang M, et al. SARS-CoV-2 viral load in upper respiratory specimens of infected patients. N Engl J Med. 2020;382:1177–1179.

[3] National Health Commission of the People's Republic of China. The notice of launching guideline on diagnosis and treatment of the novel coronavirus pneumonia. 7th ed. [cited 2020 Mar 4]. Available from: http://www.nhc.gov.cn/yzygj/s7653p/202003/46c9294a7dfe4cef80dc7f5912eb1989.shtml

[4] Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet. 2020;395:1054–1062.

[5] Newton AH, Cardani A, Braciale TJ. The host immune response in respiratory virus infection: balancing virus clearance and immunopathology. Semin Immunopathol. 2016;38:471–482.

[6] Zhao J, Zhao J, Perlman S. T cell responses are required for protection from clinical disease and for virus clearance in severe acute respiratory syndrome coronavirus-infected mice. J Virol. 2010;84:9318–9325.

Guo-Qing Qian, Xue-Qin Chen, Ding-Feng Lv
Department of Internal General Medicine, Ningbo First Hospital, Ningbo, China
These authors contributed equally to this article.

Ada Hoi Yan Ma
Nottingham University Business School, University of Nottingham – Ningbo China, Ningbo, China

Li-Ping Wang, Nai-Bin Yang, Xiao-Min Chen
Department of Internal General Medicine, Ningbo First Hospital, Ningbo, China
chxmin@hotmail.com

Received 15 March 2020; revised 20 March 2020; accepted 23 March 2020