



LETTER TO THE EDITOR

Living with COVID-19: could SARS-CoV-2 infection present a ping-pong effect?

ALESSANDRO LAGHI¹, DONATO DI NUNNO¹, ALESSANDRO AMBROSIO²,
FRANCESCA ROMANA BAFFETTI³, NAZARENO PANICHELLA⁴, ANTONIO MONTINI⁴, CARLO CATALANO⁵,
GIACOMO MAMMANA⁶, BERNARDINO MARSEGLIA²

¹Department of Medicine, Dermatology Unit, “Celio” Military Hospital, Rome, Italy; ²Department of Medicine, Unit of Cardiology, “Celio” Military Hospital, Rome, Italy; ³Department of Medicine, Emergency Unit, “Celio” Military Hospital, Rome, Italy; ⁴Department of Medicine, Unit of Internal Medicine, “Celio” Military Hospital, Rome, Italy; ⁵Department of Medicine Chief, “Celio” Military Hospital, Rome, Italy; ⁶General Director, “Celio” Military Hospital, Rome, Italy

Keywords

COVID-19 • SARS-CoV-2 • RT-PCR • False-negative • Swab

Dear Editor,

on March 11 2020, the World Health Organization (WHO) declared pandemic the disease caused by a novel coronavirus named SARS-CoV-2 (Severe Acute Respiratory Syndrome-Coronavirus-2) that still now causes symptoms like fever, cough, sore throat, breathlessness, vomiting among others. The disease is mild in most people; in some patients (usually the elderly and those with comorbidities), it may progress to pneumonia, acute respiratory distress syndrome (ARDS) and multi organ dysfunction [1]. Many people are asymptomatic, but able to transmit the infection to others [2]. Mortality estimated rate is about 5.6% [3]. Coronaviruses are enveloped, positive single-stranded large RNA viruses that infect humans, but also a wide range of animals. SARS-CoV-2 apparently succeeded in making its transition from animals to humans on the Huanan seafood market in Wuhan, China [4].

For the previous reasons, it is extremely important to individuate SARS-CoV-2 reservoirs: real-time fluorescence quantitative reverse transcriptase polymerase chain reaction (reverse transcriptase-polymerase chain reaction, RT-PCR) is the gold standard method in order to detect the infection [5]. A study suggests that the favorite biological sample should be sputum and nasopharyngeal swabs that minimize as much as possible the risk of false negative results (respective sensibility of 48.68 and 38.13%) [5]. Other authors propose oropharyngeal swab as a procedure less sensible than nasopharyngeal [6].

In Italy, we normally run both nasopharyngeal and oropharyngeal swabs in every patient who suffers from symptoms suspicious for COVID-19 [7]. In our country, serological tests are not diffusely available and nobody demonstrated that the presence antibodies against SARS-CoV-2 can protect from a reinfection [8, 9]. So patients, who are hospitalized or quarantined because of SARS-CoV-2 infection, in order to interrupt the confinement, have to obtain two consecutive negative results for virus research in oropharyngeal and nasopharyngeal swabs, using RT-PCR [7].

Here we report the peculiar history of a patient, now still hospitalized in Celio Hub Covid-Hospital, in Rome, Italy.

The requirement of informed consent was waived since patient information was anonymized to ensure privacy.

A 30-year-old woman, no smoker, with no comorbidities, no allergies and no previous hospitalization, started feeling fever (37.5°C), cough, and shortness of breath, anosmia and ageusia on 23rd March 2020. She was not taking any drugs, except for birth control pill. She is a medical doctor and she worked in February and March 2020 in some nursing home care near Milan, in the north of Italy. On 27th March she underwent oropharyngeal and nasopharyngeal swabs: the test result was positive, so she started the quarantine period at home alone. Then, her boyfriend, that lived with her, had smart-worked since 10th March 2020 and had not developed symptoms, immediately left their house and started living without any contact in his own apartment, but he has never undergone a PCR test.

Without using any therapy, the young woman recovered in one week without any social interaction and she underwent new swabs on 14th and 15th April with negative results. All the three swabs were carried out in Milan by the same nurse. On 16th April she met again her boyfriend. Since she had to work in Rome, the couple travelled to the Italian capital and there she felt symptoms again: in particular, temperature (37.7°C) and fatigue. No cough, sore throat, or vomiting were reported.

On 17th April she and her boyfriend underwent oropharyngeal and nasopharyngeal swabs: all of them were positive and they were precautionarily hospitalized.

On admission, physical examination of the young woman revealed normal vital signs with oxygen saturation of 99% breathing ambient air. Lung auscultation revealed no rhonchi. Blood routine tests, liver function, renal function, electrolytes were normal. Serological tests for SARS-CoV-2 were not run [9]. Now she is still in the hospital and she is taking only enoxaparin 4,000 IU/die.

Since RT-PCR test serves as the gold standard method to confirm the infection of SARS-CoV-2 and leads the decision of patients' discharging or quarantine interruption, false-negative results could hinder the prevention and control of the epidemic.

Some studies found a potentially high false negative rate of RT-PCR testing for SARS-CoV-2 in hospitalized patients with COVID-19 [5, 7]. In our case, the result of the two consecutive negative swabs should be trusted even because the personnel and the laboratory were the same of the first positive result. Nevertheless, the RT-PCR results showed a fluctuating trend [10], but nobody demonstrated that recurrence of RT-PCR positivity for the novel coronavirus is not associated with new risk of being a virus spreader again, even if asymptomatic. Additionally, nobody demonstrated that all the recovered patients cannot get the symptomatic (or poorly symptomatic) infection again, even with a shorter incubation time. In our situation, we cannot rule out that our patient has been infected by her boyfriend who previously got the virus from her, in a ping-pong effect. The recurrence rate in recovered – suggested by two consecutive negative swabs and absence of clinical symptoms [7] – patients after the hospital discharging or the end of quarantine is unknown and should be investigated. Further studies are needed in order to understand deeper the clinical and the epidemiological features of the virus. Several countries in the world, after a necessary period of lock down, are starting again their working activities and the infective risk will increase again in the next weeks. Since we are not able to rule out the risk of reinfection in patients clinically recovered and the possibility that they can spread the virus again, we should treat every citizen as infected and contagious, even if clinically recovered, until proven otherwise. In conclusion, we must be prepared to a future in which social distancing, face masks and virtuous sanitization procedures will be mandatory.

Acknowledgements

Funding sources: this research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflicts of interest statement

The authors declare no conflict of interest.

Authors' contributions

AL: Data Curation, Investigation, Writing - Original Draft Preparation. DDN: Data Curation, Writing - Original Draft Preparation. AA: Investigation, Visualization. FRB: Data Curation, Writing - Original Draft Preparation. NP: Data Curation, Visualization. AM: Visualization, Writing - Review & Editing. CC: Supervision, Writing - Review & Editing. GM: Conceptualization, Supervision. BM: Conceptualization, Project Administration, Supervision.

References

- [1] Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. *Acta Biomed* 2020;91:157-60. <https://doi.org/10.23750/abm.v91i1.9397>
- [2] Wu ZY. Asymptomatic and pre-symptomatic cases of COVID-19 contribution to spreading the epidemic and need for targeted control strategies. *Zhonghua Liu Xing Bing Xue Za Zhi* 2020;41:E036. <https://doi.org/10.3760/cma.j.cn112338-20200406-00517>
- [3] Baud D, Qi X, Nielsen-Saines K, Musso D, Pomar L, Favre G. Real estimates of mortality following COVID-19 infection. *Lancet Infect Dis* 2020;20:773. [https://doi.org/10.1016/S1473-3099\(20\)30195-X](https://doi.org/10.1016/S1473-3099(20)30195-X)
- [4] Velavan TP, Meyer CG. The COVID-19 epidemic. *Trop Med Int Heal* 2020;25:278-80. <https://doi.org/10.1111/tmi.13383>
- [5] Wu J, Liu J, Li S, Peng Z, Xiao Z, Wang X, Yan R, Luo J. Detection and analysis of nucleic acid in various biological samples of COVID-19 patients. *Travel Med Infect Dis* 2020:101673. <https://doi.org/10.1016/j.tmaid.2020.101673>
- [6] Wang X, Tan L, Wang X, Liu W, Lu Y, Cheng L, Sun Z. Comparison of nasopharyngeal and oropharyngeal swabs for SARS-CoV-2 detection in 353 patients received tests with both specimens simultaneously. *Int J Infect Dis* 2020;94:107-9. <https://doi.org/10.1016/j.ijid.2020.04.023>
- [7] "Protocollo di gestione clinica COVID-19." Available at: <https://www.inmi.it/wp-content/uploads/2020/04/3-COVID-19-Protocollo-di-gestione-clinica-19-marzo.pdf> (accessed on 23/04/2020).
- [8] Tang Y-W, Schmitz JE, Persing DH, Stratton CW. The laboratory diagnosis of COVID-19 infection: current issues and challenges. *J Clin Microbiol* 2020;58:e00512-20. <https://doi.org/10.1128/JCM.00512-20>
- [9] "Italy's Diasorin aims to launch COVID-19 antibody test by end-April - Reuters." Available at: <https://www.reuters.com/article/us-health-coronavirus-diasorin/italys-diasorin-aims-to-launch-covid-19-antibody-test-by-end-april-idUSKBN21P111> (accessed on 23/04/2020).
- [10] Li Y, Yao L, Li J, Chen L, Song Y, Cai Z, Yang C. Stability issues of RT-PCR testing of SARS-CoV-2 for hospitalized patients clinically diagnosed with COVID-19. *J Med Virol* 2020;92:903-8. <https://doi.org/10.1002/jmv.25786>

Received on April 29, 2020. Accepted on January 27, 2021.

Correspondence: Alessandro Laghi, Department of Medicine, Dermatology Unit, "Celio" Military Hospital, piazza Celimontana 50, 00184 Rome, Italy - Tel.: +39 3271617756 - E-mail: laghial@hotmail.it

How to cite this article: Laghi A, Di Nunno D, Ambrosio A, Baffetti FR, Panichella N, Montini A, Catalano C, Mammana G, Marseglia B. Living with COVID-19: could SARS-CoV-2 infection present a ping-pong effect? *J Prev Med Hyg* 2021;62:E1-E2. <https://doi.org/10.15167/2421-4248/jpmh2021.62.1.1555>

© Copyright by Pacini Editore Srl, Pisa, Italy

This is an open access article distributed in accordance with the CC-BY-NC-ND (Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International) license. The article can be used by giving appropriate credit and mentioning the license, but only for non-commercial purposes and only in the original version. For further information: <https://creativecommons.org/licenses/by-nc-nd/4.0/deed.en>