

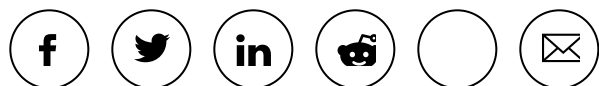
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Strong Inverse Correlation Between SARS-CoV-2 Infectivity and Cycle Threshold Value



Sweta Gupta



Correlation between successful isolation of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in cell culture and cycle threshold (Ct) value of quantitative reverse transcription polymerase chain reaction (RT-PCR) targeting E gene suggests that patients with coronavirus disease 2019 (COVID-19) with Ct above 33 to 34 are not contagious and can be discharged from hospital care or strict confinement, according to a brief report published in the *European Journal of Clinical Microbiology & Infectious Diseases*.

Previous research has observed that SARS-CoV-2 was detected by PCR up to 20 days after onset of symptoms; however, the virus could not be isolated after day 8 in spite of ongoing high viral loads of approximately 10⁵ RNA copies/mL of sample. This highlights that isolation of patients with COVID-19 should be isolated after diagnosis. But due to the prolonged shedding of RNA in respiratory samples, when can a clinician consider a patient with COVID-19 as no longer contagious?

In order to answer this question, researchers at the Méditerranée Infection University Hospital Institute in Marseille, France obtained 183 samples (174 nasopharyngeal swabs and 9 sputum samples) from 155 patients and inoculated them in cell cultures to correlate viral load to cultivable viruses. SARS-CoV-2 RNA positivity in patient samples was assessed by real-time RT-PCR targeting the E gene.

Among the 183 samples inoculated, 129 led to virus isolation with 124 samples having a detectable cytopathic effect between 24 and 96 hours. Researchers observed a significant relationship between Ct value and culture positivity rate. Samples with Ct values of 13 to 17 all led to positive culture.

Culture positivity rate then decreased progressively inversely proportional with Ct values, to reach 12% at a 33 Ct value. No culture was obtained from samples with Ct value of > 34.

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Based on this data, researchers deduced that patients with Ct values > 34 do not excrete infectious viral particles and thus may be discharged. They noted that in 6 patients treated with hydroxychloroquine and azithromycin, the current therapeutic protocol used at their institution, Ct values obtained between days 2 and 4 post-treatment were above 34.

Because hospitals use “different systems of sample transport, of RNA extraction, and of PCR with different primers and probes,” findings from study cannot be extrapolated to other hospital centers. Researchers proposed “that each center perform its own correlation between culture results and viral RNA load from patients’ samples.”

Reference

La Scola B, Le Bideau M, Andreani J, et al. Viral RNA load as determined by cell culture as a management tool for discharge of SARS-CoV-2 patients from infectious disease wards [published online April 27, 2020]. *Eur J Clin Microbiol Infect Dis*. doi:10.1007/s10096-020-03913-9

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