



SHORT REPORT

Anesthesia and surgery for positive COVID-19 asymptomatic pediatric patients: How long should we wait?

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The worldwide spread of the novel SARS-CoV-2 coronavirus (COVID-19) led to significant challenges for healthcare institutions. Our institution implemented guidelines to protect perioperative staff and patients from exposure to COVID-19, including pre-procedural testing.¹ Patients who tested positive SARS-CoV-2 had their elective procedure postponed and quarantined as per Center for Disease Control and Prevention (CDC) guidelines.² A test-based strategy is no longer recommended by the CDC for COVID-19 patients to come off isolation.² Instead, patients can be cleared from isolation precautions using time and symptom-based criteria. However, there are limited data addressing the role of retesting and appropriate scheduling of procedures after a positive test in an asymptomatic patient.³ Following a positive test, our institution delayed surgery and retested the patient requiring a negative test result to proceed with elective procedures. We herein describe the patterns of laboratory values of COVID-19-positive patients with a focus on those who we define as "persistently positive" to elucidate a safe pathway to bring patients to surgery.

This is a retrospective review of pediatric patients scheduled for elective procedures under anesthesia at Children's National Hospital from April 3, 2020 to September 1, 2020 who persistently tested positive for SARS-CoV-2 PCR test. Data were extracted from electronic medical records and stored in a RedCap database. Persistently positive was defined as patients who tested positive multiple times. Laboratory testing occurred 24–48 h prior to scheduled procedure via a nasopharyngeal swab using one of three molecular diagnostic

assays validated in our laboratory.¹ A characteristic of the SARS-CoV-2 PCR test is the cycle time (Ct), which is the number of polymerase chain reaction (PCR) cycles required to reach a detectable level of the virus. A higher Ct indicates lower viral load and perhaps lower transmissibility.⁴ We report the median Ct values of patients tested successively over time. Patients received a phone screen by a preoperative nurse 48 hours prior to procedure, where COVID-19 symptoms were elicited. Patients were excluded if they became symptomatic or if the initial positive test's Ct value was not available. A Ct value of 40 was recorded if the Ct was 40 or higher, as two of the three assays used do not report Ct above 40. This study was approved by the Institutional Review Board.

Of the 5595 patients tested, 103 children (1.84%) tested positive for COVID-19. Two children were excluded due to reported symptoms. Of the remaining 101 patients, twenty-nine were found to be persistently positive. Four out of the 29 were excluded because Ct values from the first test were not available. Median Ct values of 25 patients were measured over time (Figure 1). The estimated Ct values at day 0 (initial test), day 14, and day 28 were 30.75 (95% CI: 28.02, 33.49), 35.17 (95% CI: 30.28, 40.06), and 38.04 (95% CI: 33.88, 42.19), respectively.

Due to the potential transmission of COVID-19 to hospital staff and perioperative complications for the patient, elective surgeries are delayed in asymptomatic patients who are COVID-19-positive.³ However, there is limited guidance on retesting for SARS-CoV-2 or when to safely reschedule elective procedures without additional

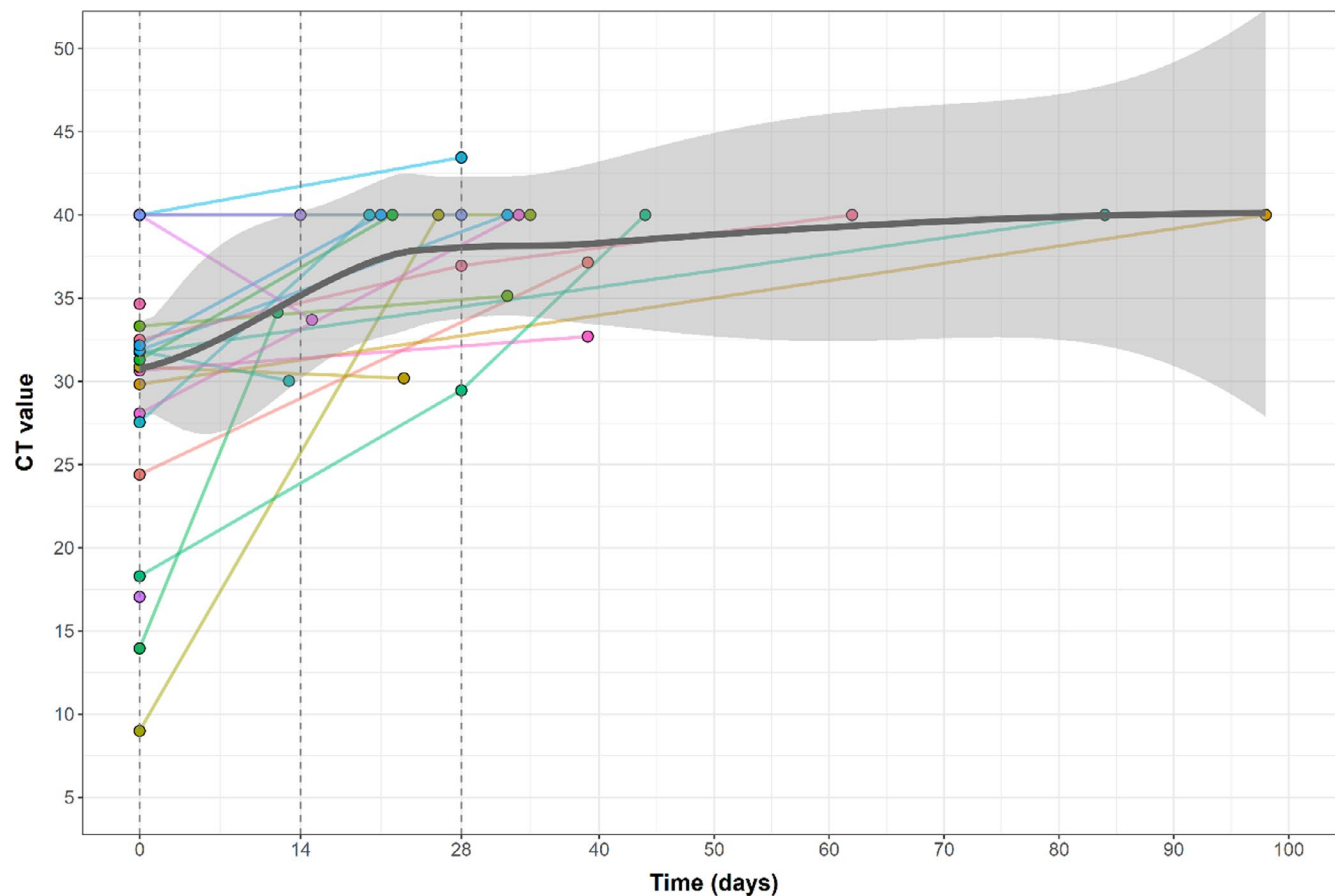


FIGURE 1 Ct values of persistently positive COVID-19 patients over time. Day 0 is the initial test 24–48 h prior to procedure date. SARS-CoV-2 PRC assays included AllPlex™ 2019-nCoV Assay (Seegene, Inc., Seoul, South Korea), the Xpert® Xpress SARS-CoV-2, Cepheid, Sunnyvale, CA), and the Simplex™ COVID-19 Direct assay (DiaSorin Molecular LLC, Cypress, CA). A trend line was created using Locally Estimated Scatterplot Smoothing method. The shaded region is the 95% confidence interval around the mean [Colour figure can be viewed at wileyonlinelibrary.com]

testing. Studies correlating Ct values and viral culture as a surrogate for infectivity have found that at Ct value of 35 or higher, less than 3% of samples will have viral growth in culture consistent with very low likelihood of the sample containing infective viral particles.^{4,5} Ct values greater than 35 therefore likely correlate with resolving infection. We found that by day 14, 81% of patients reached Ct value of 35, which increased to 86% by day 28. Our preliminary data suggest retesting may be unrevealing and elective surgery should be delayed for a minimum of 28 days from the initial positive test, allowing time to reduce transmissibility and minimize anesthesia risks in asymptomatic pediatric patients, similar to recent Anesthesia Patient Safety Foundation recommendations.³ Even with a 28-day delay, the risk of infection is not zero; therefore, full personal protective equipment (PPE) remains essential for all aerosol-generating procedures. Further research is warranted to better determine the optimal length of delay of anesthesia for asymptomatic COVID-19 patients as well as how testing and Ct values can guide our practice.

CONFLICT OF INTEREST

None.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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