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Concise Communication

Assessing the utility of universal preprocedure severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) polymerase chain reaction (PCR) testing at a cancer center

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Abstract

We implemented preprocedure severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) testing for cancer patients. The overall positivity rate was 0.3%. Preprocedure testing may be limited to operative procedures as community rates of SARS-CoV-2 exceed 7%. Nonoperative aerosol-generating procedures may be performed without preprocedure testing, wearing the appropriate personal protective equipment.

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Curtailment of essential services, such as surgery and endoscopy due to concerns about healthcare personnel (HCP) and patient safety, adversely affected cancer care during the initial stages of the coronavirus disease 2019 (COVID-19) pandemic.[1] To allow safe for re-expansion of services, professional societies recommended severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) testing for asymptomatic patients 48–72 hours prior to major surgeries and aerosol-generating procedures (AGPs) such as gastrointestinal endoscopy and bronchoscopy, as well as administration of general anesthesia.[2–5] Alternatively, given no evidence of poor outcomes following nonoperative AGPs among COVID-19 patients, centers with adequate personal protective equipment (PPE) supplies could choose to forego preprocedure testing and implement the use of appropriate PPE, including N95 respirators, during these procedures.[2]

Up to 30% of COVID-19 patients may test negative using molecular methods,[5] which may lead to false reassurance for HCP and patients. Furthermore, positive preprocedure tests may cause unnecessary delays in cancer treatment. Although several studies have reported a low yield of universal preprocedure SARS-CoV-2 testing, this strategy remains widely implemented.[6,7] Moreover, despite advances in therapeutics and COVID-19 vaccination for cancer patients, most guidelines recommending preprocedure testing were last updated in 2020. We conducted this study to determine the utility of universal preprocedure SARS-CoV-2 polymerase chain reaction (PCR) testing among cancer patients at Shaukat Khanum Memorial Cancer Hospital and Research Center (SKMCH&RC) in Lahore, Pakistan.

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Methods

Study setting and design

We conducted this retrospective, observational study at SKMCH&RC (Lahore, Pakistan), a 210-bed, tertiary-care, cancer hospital catering to pediatric and adult cancer patients from across Pakistan. This study was approved by the SKMCH&RC Institutional Review Board with a waiver of informed consent.

SARS-CoV-2 testing and PPE recommendations

In June 2020, we implemented preprocedure SARS-CoV-2 PCR testing within 72 hours of scheduled AGPs including bronchoscopy, gastrointestinal endoscopy, transesophageal echocardiography, and operative and nonoperative procedures requiring general anesthesia. The SKMCH&RC molecular biology department performed all PCR tests on site using cobas SARS-CoV-2 on the cobas 6800/8800 system (Roche Molecular Systems, Rotkreuz, Switzerland). Patients with negative PCR results were screened for symptoms of COVID-19 on the day of the procedure. Nonurgent procedures for patients with a positive SARS-CoV-2 PCR or positive symptom screen following a negative PCR were deferred for up to 2 weeks at the discretion of the attending physician. Additional PPE for bronchoscopies and procedures requiring general anesthesia comprised impermeable gowns, gloves, face shields, and N95 respirators in addition to standard PPE regardless of PCR results. Staff performing upper and lower gastrointestinal endoscopies substituted N-95 respirators with surgical facemasks for patients with negative PCR results.

Study population and study definitions

We included all asymptomatic patients who underwent preprocedure SARS-CoV-2 PCR testing between January 1 and November 13, 2021. Low community prevalence of COVID-19 was defined as <7%, moderate was defined as 7%–15% and high community prevalence was defined as >15%. Postprocedure complications

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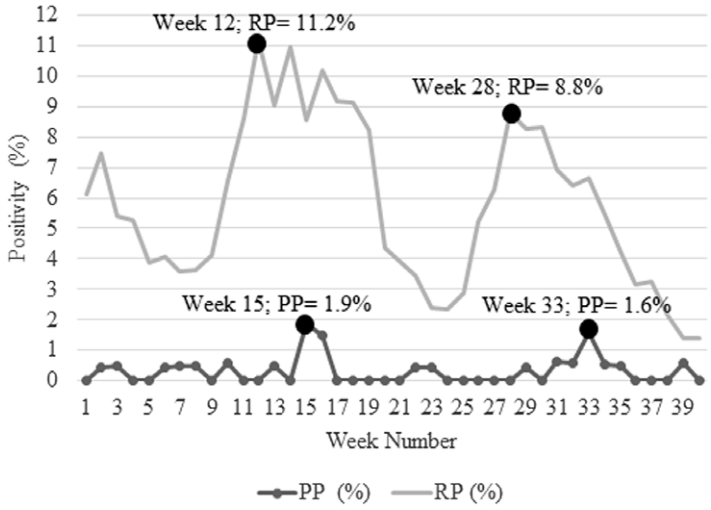

Fig. 1. Trends in preprocedure SARS-CoV-2 PCR positivity compared with regional positivity.
Note. SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; PCR, polymerase chain reaction; RP, regional positivity; PP, preprocedure positivity at Shaukat Khanum Memorial Cancer Hospital and Research Center.

were defined as respiratory distress, prolonged hospitalization, intensive care unit stay due to COVID-19, or 28 day all-cause mortality among those who underwent scheduled procedures despite positive preprocedure tests.

Analysis

We compared the weekly positivity rates of preprocedure testing at our center with regional positivity rates using the official Government of Pakistan website.[8] The total healthcare expenditure on preprocedure SARS-CoV-2 PCR tests was calculated in US dollars (US$). We determined the age and sex of patients with positive preprocedure tests. Data were obtained on the following variables for patients with positive preprocedure tests who underwent procedures: details of the procedure performed, chemotherapy received in the previous 4 weeks, neutropenia at the time of procedure, and postprocedure complications. Medians and ranges were calculated for continuous variables, and frequencies and proportions were calculated for categorical variables.

Results

In total, 8,386 asymptomatic patients underwent preprocedure SARS-CoV-2 PCR tests: 2,639 prior to AGPs and 5,747 prior to procedures requiring general anesthesia. Among them, 26 (0.3%) tested positive. The median age of patients with positive preprocedure tests was 47 years (range, 4–77 years), and 9 (35%) were female. Moreover, 23 procedures (88.5%), including 15 AGPs and 8 procedures requiring general anesthesia, could not be safely deferred upon evaluation by the attending physicians. None of these patients had received chemotherapy over the previous 4 weeks or were neutropenic. We noted no postprocedure complications among patients with positive preprocedure SARS-CoV-2 PCR tests. The preprocedure positivity remained below 0.5% for the greater duration of the study period. We observed a preprocedure PCR positivity rate >1% during 3 weeks (weeks 15, 16, and 33), coinciding with a regional SARS-CoV-2 positivity rate >6.6% (Fig. 1). The total healthcare expenditure on preprocedure SARS-CoV-2 testing was US$313,270. The direct healthcare cost to identify a single patient with asymptomatic or presymptomatic COVID-19 was US$12,514.

Discussion

The results of our study revealed that universal preprocedure SARS-CoV-2 testing for cancer patients may be a low-yield approach as demonstrated by the low positivity rates (n = 26, 0.3%) and high direct healthcare cost (US$12,514) to identify a single patient with asymptomatic or presymptomatic COVID-19. Preprocedure SARS-CoV-2 PCR positivity varied with regional positivity. The overall test positivity did not exceed 2%, despite regional SARS-CoV-2 positivity of up to 11.2% recorded during the study period. Moreover, 23 patients with positive PCR tests (88.5%) underwent the procedures as planned given the time-sensitive nature of the interventions. Our results revealed no COVID-19–related complications among these patients following the procedures.

We did not observe the high rates of postoperative mortality among COVID-19 patients that have been reported previously.[9] This lower rate may be due to the small number of patients with positive preprocedure SARS-CoV-2 PCR tests in our study. Our results are in line with previous studies reflecting a low yield of universal preprocedure SARS-CoV-2 testing in areas with low community prevalence.[6,7,10]

This study had several limitations. The study had a single-center design and a small number of patients with positive preprocedure tests. We did not assess the risk of postprocedure COVID-19 among HCP. The results of our study may not be generalizable to cancer patients with neutropenia or recent chemotherapy.

Universal preprocedure testing for asymptomatic cancer patients may be unnecessary in areas with a low prevalence of COVID-19. Furthermore, due to the time-sensitive nature of cancer treatment, it may be unsafe to defer planned procedures for patients testing positive. Cancer centers may consider discontinuing preprocedure testing prior to nonoperative AGPs, such as bronchoscopy and gastrointestinal endoscopy, because these procedures do not entail harm to the patients. When the planned procedures cannot be safely deferred for up to 2 weeks, N95 masks along with other dedicated COVID-19 PPE must be worn

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by HCP during these procedures.[2] Preprocedure testing for asymptomatic cancer patients may instead be implemented prior to operative procedures in regions with moderate and high regional SARS-CoV-2 positivity rates and among patients with neutropenia or recent chemotherapy. Further studies must be conducted to explore the impact of COVID-19 vaccination on preprocedure SARS-CoV-2 positivity and postoperative outcomes among vaccinated cancer patients.

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Conflicts of interest. All authors report no conflicts of interest relevant to this article.

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