




Mandatory preoperative COVID-19 testing for cancer patients—Is it justified?

Sri Siddhartha Nekkanti MS^{1,2}  | Sudhir Vasudevan Nair MS, MCh^{2,3}  |
Vani Parmar MS, DNB^{2,3} | Avanish Saklani MS, FRCS^{1,2}  |
Shailesh Shrikhande MS, MD, FRCS^{1,2} | Nitin Sudhakar Shetty MD, DNB^{2,4} |
Amit Joshi MD, DM^{2,5} | Vedang Murthy MD^{2,6} | Nikhil Patkar MD, DNB^{2,7} |
Navin Khattry MD, DM^{2,5} | Sudeep Gupta MD, DM^{2,5}

¹Department of Surgical Oncology, Tata Memorial Centre, Mumbai, Maharashtra, India

²Health Sciences, Homi Bhabha National Institute, Mumbai, Maharashtra, India

³Department of Surgical Oncology, Advanced Centre For Treatment Research and Education in Cancer, Tata Memorial Centre, Navi-Mumbai, India

⁴Department of Radiodiagnosis, Advanced Centre For Treatment Research and Education in Cancer, Tata Memorial Centre, Navi-Mumbai, India

⁵Department of Medical Oncology, Advanced Centre For Treatment Research and Education in Cancer, Tata Memorial Centre, Navi-Mumbai, India

⁶Department of Radiation Oncology, Advanced Centre For Treatment Research and Education in Cancer, Tata Memorial Centre, Navi-Mumbai, India

⁷Department of Pathology, Advanced Centre For Treatment Research and Education in Cancer, Tata Memorial Centre, Navi-Mumbai, India

Correspondence

Sudhir Nair, MS, MCh, Department of Surgical Oncology, Advanced Centre For Treatment Research and Education in Cancer, Tata Memorial Centre, Homi Bhabha National Institute, Navi-Mumbai 410210, India.
Email: sudhirvr@gmail.com and snair@actrec.gov.in

Abstract

Background: Severe acute respiratory syndrome coronavirus 2 has caused substantial disruptions in routine clinical care. Emerging data show that surgery in coronavirus disease (COVID)-positive cases can be associated with worsening of clinical outcomes and increased postoperative mortality. Hence, preoperative COVID-19 testing for all patients before elective surgery was implemented in our institution.

Materials and Methods: Two hundred and sixty-two asymptomatic cancer patients were preoperatively tested for COVID-19 using reverse-transcription polymerase chain reaction technique with nasopharyngeal and oropharyngeal swabbing. All negative patients were operated within 72 hours, and positive patients were quarantined for a minimum 14 days before re-swabbing.

Results: In our cohort, 21 of 262 (8.0%) asymptomatic preoperative patients, who were otherwise fit for surgery, tested positive. After adequate quarantine and a negative follow-up test report, 12 of 21 (57%) had an operation. No major postoperative morbidity due to COVID-19 was noted during the immediate postoperative period before discharge from the hospital.

Conclusion: Routine preoperative COVID-19 testing was successful in identifying asymptomatic viral carriers. There was no incidence of symptomatic COVID-19 disease in the postoperative period, and there was no incidence of morbidity attributable to COVID-19. These data suggested a beneficial role for mandatory preoperative COVID-19 testing.

KEYWORDS

cancer and COVID-19, COVID-19, COVID-19 and cancer surgery, preoperative COVID testing

1 | INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 has caused substantial disruptions in the routine clinical care in most countries. As a cancer center, our hospital decided to continue providing essential cancer care

including routine procedures with adequate consideration for safety of staff and patients, though in reduced numbers. Due to the high prevalence of asymptomatic cases in our geographic region, preoperative coronavirus disease 2019 (COVID-19) testing was implemented for all patients before elective surgery. This decision was based on factors

associated with this pandemic. First, it was known that a substantial percentage of patients with COVID-19 are asymptomatic¹ and can be missed by routine symptom-based screening. Second, preliminary data from China and other countries demonstrated that surgery in COVID-positive cases can be associated with worse clinical outcomes and increased postoperative mortality.² Finally, the impact of asymptomatic COVID-19 positive cases on health care providers and other patients in the hospital was not clear. Moreover, the shortages of personal protective equipment (PPE) during the initial phase of the pandemic also caused resource constraints and restrictions of usage. Though a universal protection policy was adopted in managing all patients visiting the hospital, COVID-19-positive cases required additional stringent protective measures and stricter isolation protocols. In this short report, we analyzed our preoperative COVID-19 testing strategy, its impact on staff and patient safety, and the outcomes after definitive cancer surgery.

2 | MATERIALS AND METHODS

Our hospital started preoperative testing for COVID-19 on 18 April 2020. From that date to 20 June 2020, we tested 262 patients with cancer. The majority of these patients had cancers of the breast ($n = 142$), gastro-intestinal tract ($n = 85$) or head and neck ($n = 35$), and 114 of 262 (55.7%) were in stage III. (Table 1). All patients were previously evaluated by the respective cancer surgeons and planned for elective radical procedures. The COVID-19 testing was done by a standard real-time reverse transcription polymerase chain reaction test approved by the Indian Council for Medical Research. Samples were collected by the nasal and oropharyngeal swabbing of each patient. After swabbing, the patients were sent back to their homes and requested to stay isolated till the availability of the results.

3 | RESULTS

Of the 262 patients who underwent initial preoperative COVID 19 testing, 230 (87.9%) were negative, 18 (6.8%) were positive and 14 were inconclusive. All the inconclusive cases underwent a second testing, where eleven patients became negative, two became positive and one remained inconclusive. The last patient was considered as a positive case per our institutional protocol. Therefore, the final COVID19 status before surgery was negative in 241 (92.1%) and positive in 21 (8.0%). It is important to note that all these patients were initially deemed fit to undergo surgery and were asymptomatic at the time of testing (Table 2). We did not observe any gender difference in COVID-19 infectivity.

Of the 241 COVID-19 negative patients, 237 (98.3%) were admitted within 24 hours after the results were available (within 48 hours after swabbing), and they underwent the pre-planned cancer surgery during the same admission. All patients were postoperatively monitored for specific COVID-19 symptoms like cough, respiratory difficulty or persistent unexplained fever not responding to antibiotics. We were able to discharge all these patients without any significant postoperative events or any signs of COVID-19.

TABLE 1 Distribution of various clinical factors

	Number (%), total = 262
Age	
Mean	48.5
Median	50.0
Gender	
Female	175 (66.7)
Male	87 (33.2)
Cancer sites	
Head and neck	35 (13.4)
Breast	142 (54.2)
Gastrointestinal	85 (32.1)
Cancer stage	
I/II	65 (24.8)
III	146 (55.7)
IV	43 (16.4)
Non-cancerous ^a	8 (3.1)

^aProcedures like stoma closure, revision mastectomy, and neck node biopsies.

The 21 patients who tested positive for COVID-19 were reported to the local health authorities, as per our national guidelines. Since these patients were asymptomatic, 17 were managed by home quarantine only. Four patients were transferred to local corona care centers, as health authorities felt that sufficient safety precautions could not be instituted in their residential areas. Of the 21 patients who were initially positive, all

TABLE 2 Preoperative COVID-19 status

	Number (%)		
Initial COVID-19 report			
Negative	230	(87.9)	
Positive	18	(6.8)	
Inconclusive	14	(5.3)	
Total	262		
Final report after re-swabbing for inconclusive cases			
Negative	241	(92.0)	
Positive	21	(8.0)	
Total	262		
Gender versus preoperative COVID-19 status			
Gender	COVID-19 report		Total
	Negative (%)	Positive (%) (95% CI)	
Female	161	14 (8.0) (4.4-13.0)	175
Male	80	7 (8.1) (3.3-15.0)	262
Total	241	21 (8.0) (5.0-11.0)	262

Abbreviations: CI, confidence interval; COVID-19, coronavirus disease 2019.

remained asymptomatic except one patient who developed respiratory complications, required hospitalization, and succumbed to COVID-19 infection.

After a minimum quarantine period of 15 days, patients had repeat testing for COVID-19. Thirteen patients became negative on repeat testing at periods varying from 16 to 60 days (mean: 35.4; median: 34). A test-based strategy was adopted for these patients in which two consecutive negative swabs ≥ 24 hours apart were required before admission to the hospital for surgery.¹ At the time of this writing, 12 of 20 patients (60%) already had the planned surgical procedure. One patient developed malaria, hence surgery was postponed. Five patients were unable to return from their hometown due to the nation-wide lock down and travel restrictions. Among them, two are seeking cancer treatment at a local hospital. A patient with cancer of buccal mucosa is currently undergoing radiotherapy in his hometown. Another patient, originally planned for a colostomy closure, decided to delay the procedure for some months and refused to be admitted (Figure 1).

4 | DISCUSSION

The COVID-19 pandemic has been a challenge for hospitals. The long established processes for admitting and treating patients has been revised to accommodate the new challenges. While many hospitals discontinued elective procedures, Tata Memorial Center decided to

continue with elective cancer surgeries, though in reduced numbers.³ A screening counter and fever clinic was established to screen and isolate patients with symptoms of COVID-19 infection, along with implementation of administrative reforms to address the new challenges.⁴ A dedicated COVID-19 ward and intensive care unit were established using existing infrastructure, though that resulted in reduced bed strength for routine cancer care. Our hospital was also successful in establishing an approved COVID-19 testing laboratory early on, and we were able procure adequate supply of the testing kits. However, as soon as several reports of asymptomatic COVID-19 positive cases began to emerge, the routine symptom-based screening was deemed insufficient. The asymptomatic proportion was between 1.6% to 56.5%,⁵ and there were conflicting reports regarding infectivity of these patients.⁶ Patients who are positive but devoid of symptoms can be in two categories: some will never develop significant symptoms during the entire course of the illness and they are called as "asymptomatic" patients; many patients eventually develop some symptoms and if the test had detected virus before they develop symptoms, they are called as "pre-symptomatic" patients. It is believed that the latter of these patients spread virus during the presymptomatic and symptomatic phases of the illness. However, the role of asymptomatic patients in the viral transmission is still not clear. The percentage of COVID-19-positive cases in our preoperative cohort was 8.0%, and all except one patient remained asymptomatic. The interval to turn negative from the initial positive swab ranged from 16 to 60 days. Since this cohort included only the

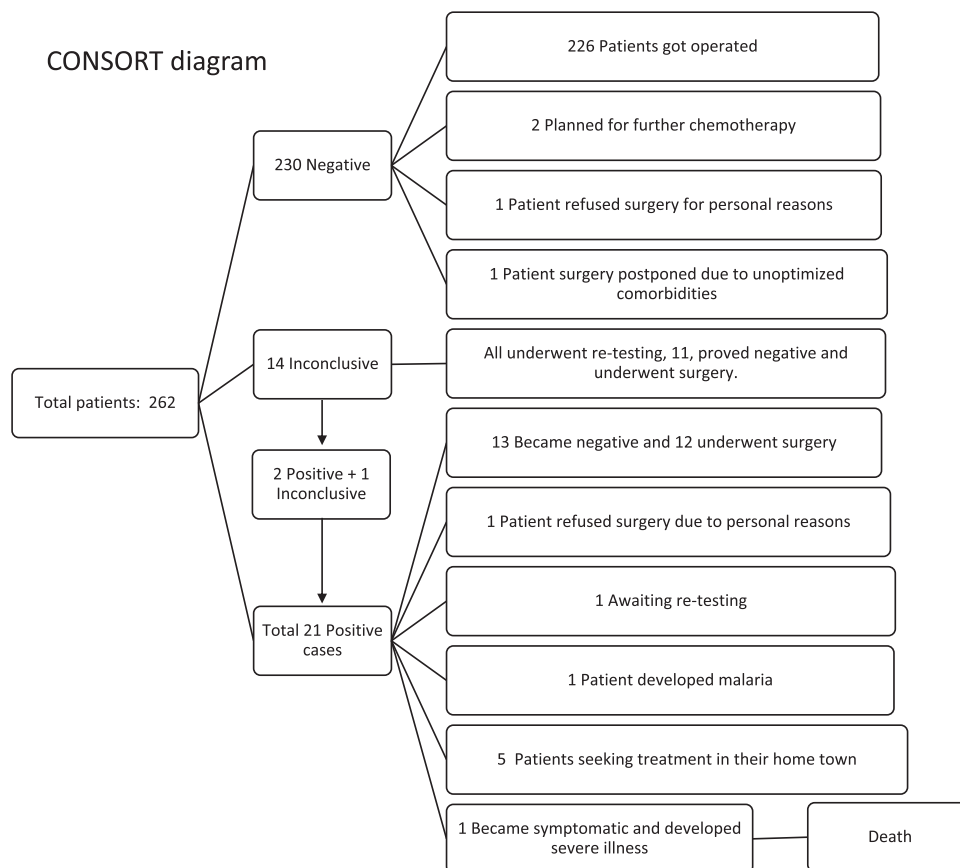


FIGURE 1 CONSORT diagram explaining the flow of patients

asymptomatic patients who were otherwise fit for surgery, the proportion of asymptomatic COVID-19 positive cases was higher (20/21 [95%]) compared with community studies in which the proportion of asymptomatic patients ranges between 40% and 45%.^{1,7}

Some might opine that asymptomatic COVID-19-positive patients could undergo regular procedures in the hospital, citing experience with previous corona virus infections.⁸ However, there are multiple problems associated with asymptomatic patients with COVID-19. First, this is a new virus, and the scientific community is not clear about its characteristics including the disease transmission from asymptomatic carriers.⁹ It is also difficult to classify patients as asymptomatic or presymptomatic by a single swab. Multiple swabbing and close follow-up of patients are required to classify them as asymptomatic or presymptomatic. Early reports from China and Italy noted that most common symptoms of COVID-19 were fever (90%), cough (75%), and dyspnea (50%).¹⁰ However, these are proportions from symptomatic cohorts since initial focus targeted symptom-based screening. Later on, asymptomatic cases were identified, and the initial estimate was around 18% as demonstrated by the study of cases on board Diamond Princess cruise ship.¹¹ In a study on residents of the northern Italian town of Vo', researchers noted that 41% to 44% of COVID-19 positive cases were asymptomatic, and they remained symptom free between two nasopharyngeal swabs 14 days apart.¹ They also confirmed through contact tracing that several new cases of COVID-19 detected in the second sampling had been caused by exposure to previously positive asymptomatic cases.

COVID-19 severity also depends on patient characteristics like age, gender, and presence of co-morbidities like diabetes or hypertension.¹² Even in cancer patients, these factors are associated with increased mortality risk, though cytotoxic chemotherapy or radiotherapy did not increase the risk of mortality.¹³ However, in the case of surgery, pulmonary complications and mortality rates were significantly higher¹⁴ when COVID-19 positive cases had surgery. In our cohort, though we observed a few major postoperative complications (16/249 [6.4%]; (Table 3)), none were attributable to COVID-19 infection. One patient succumbed to myocardial infarction on the 4th postoperative period and had surgical complications. Though we have adopted universal precautions and enforced compulsory wearing of high-quality masks, social distancing, and personal hygiene for patients and staff, managing a COVID-19 positive case, whether symptomatic or asymptomatic added many more challenges. The appropriate types of PPE in these situations will be different, isolation beds are needed, and more stringent waste disposal measures are required per health authority guidelines. These are labor intensive measures that can cause substantial financial burden on the hospital. Moreover, in the initial stages, there was a scarcity for PPEs, and the available resources were reserved for COVID-19 positive cases. The policy of preoperative screening has reduced the necessity of using scarce PPEs and additional infrastructure requirements.

Delay in elective cancer surgery can lead to disease progression and impact overall survival. However, we need to do a risk and benefit analysis in such situations. We feel that it is beneficial for the patient

TABLE 3 Postoperative complications

Postoperative complications	n = 249 (%)
None	198 (79.5)
Minor	34 (13.7)
Major	16 (6.4)
Death	1 (0.4)

Note: Grading using Clavien-Dindo classification (grade I/II: minor; grade III/IV: major; grade V: death).¹⁵

and the community to treat COVID-19 first and then treat the cancer. Considering the increased mortality, additional burden on hospital infrastructure, and associated social problems for patients and relatives, an approach based on testing COVID-19 status before elective surgery was our optimal choice. We were able to operate on twelve patients out of thirteen who had turned negative during the follow-up tests and in one case the surgery was deferred as it was not an urgent procedure, and the patient opted to undergo surgery after few months. Only three patients could not come back to the hospital due to travel restrictions, and we expect them to return for treatment. There can be chances of false positivity in apparently negative cases, and we might have missed those cases. However, we did not have any postoperative complications suggestive of COVID-19 infection, except in one patient who had fever and tachypnea on the third postoperative day, for which we repeated the COVID-19 testing that turned out to be negative.

5 | CONCLUSION

Routine preoperative COVID-19 testing was successful in identifying asymptomatic patients with COVID-19. There was no incidence of symptomatic COVID-19 disease in the postoperative period and there was no morbidity attributable to COVID-19. In our opinion, these data supported a beneficial role associated with mandatory preoperative COVID testing.

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.

ORCID

Sri Siddhartha Nekkanti  <http://orcid.org/0000-0001-7376-0682>

Sudhir Vasudevan Nair  <http://orcid.org/0000-0003-4977-3779>

Avanish Saklani  <http://orcid.org/0000-0003-4498-7612>

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