

# Continuing Cancer Treatment in a “COVID HOTSPOT” in India: Are We Overestimating the Risks?

## Abstract

**Context:** We describe the treatment of cancer patients carried out in a Government of India-designated, dedicated coronavirus disease (COVID) hospital (DCH) in a COVID hotspot in India. **Aims:** The aim was to study the change and delay in the management of cancer patients during the pandemic and its complications. **Settings and Design:** This was an observational cohort study conducted at a tertiary care center, which was also a DCH. **Subjects and Methods:** Cancer patients receiving cancer surgery, chemotherapy, and radiotherapy in our DCH, during the lockdown, were studied. **Results:** A total of 864 patients received treatment for cancer in our hospital during the period of March 20, 2020 – May 31, 2020. There were no COVID-related complications. The treatment of 109/864 patients (12.61%) was delayed due to the pandemic and lockdown situation and the treatment plan was changed for 84/864 (9.72%) patients. There were 21 deaths in these 864 patients (2.43%), but only two deaths were COVID related. Symptomatic patients were tested for COVID, and 3/864 patients (0.34%) were detected to be COVID positive. **Conclusions:** We successfully delivered cancer treatment to patients in our DCH. The percentage of adverse effects, symptomatic COVID infection, and related mortality has been very low in our study. Cancer care can be continued with due diligence even during this pandemic.

**Keywords:** Cancer surgery, cancer treatment, chemotherapy, COVID-19 pandemic, radiotherapy

## Introduction

The coronavirus disease 2019 (COVID-19) pandemic has deemed it necessary for clinicians to view patient treatment guidelines in the context of the danger of hospital-acquired COVID infection. Elective surgeries and procedures have been postponed and only emergency and lifesaving procedures are carried out.

Cancer treatment places different challenges in front of oncologists because delay in therapy can result in progression of cancer with worsening of outcome.<sup>[1]</sup>

The first patient of COVID in Pune, Maharashtra, India, was detected on March 9, 2020. Thereafter, the number of patients in Pune district and Maharashtra state kept on increasing exponentially, and hence, Pune has been labeled as a hotspot for COVID infection [Figures 1a-c]. The Government of India announced a nationwide lockdown on March 24, 2020, which was extended in different phases. At the time of writing this article, India was

in its 5<sup>th</sup> phase of lockdown, from June 1, to June 30. We present a cohort study of cancer patients treated at our tertiary care designated COVID hospital.

## Aims and objectives

Our aim has been to study the change and delay in the management of cancer patients in this pandemic and lockdown situation. We have studied the comorbidity profile and complications in these patients and evaluated symptomatic patients for COVID infection in the study period and the follow-up period till June 15.

## Subjects and Methods

This was a cohort study in which we evaluated patients receiving cancer treatment in our hospital during the period of March 20, 2020 – May 31, 2020. They were further followed up till June 15, 2020, considering the incubation period for COVID-19 infection. The institutional ethics committee approved this study.

All newly registered patients who underwent cancer surgery, chemotherapy,

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radiotherapy, or palliative care in our hospital during the study period were included in the study. Those patients who were already receiving treatment for cancer were also included. Cancer patients who were only on supportive care treatment were excluded from the study.

Consent was obtained from the patients included in the study. Information gathered for this study included patient demographics, comorbidity profile, delay in starting treatment, complications, and COVID-19 infection and related morbidity in patients. Delay was defined as any delay in initiating planned treatment of >7 days.

The required data were obtained from the patients, treating doctors, and electronic medical records of the hospital.

Microsoft Excel Version 22019 16.0.6742.2048 (Microsoft Corporation, Redmond, Washington, USA) and IBM SPSS Statistics for Windows version V26 (IBM Corp., Armonk, N.Y., USA) were used for data recording and analysis. Chi-square test was used to rule out any difference between

the mortality during the study period and the mortality during the preceding 2 months.

## Results

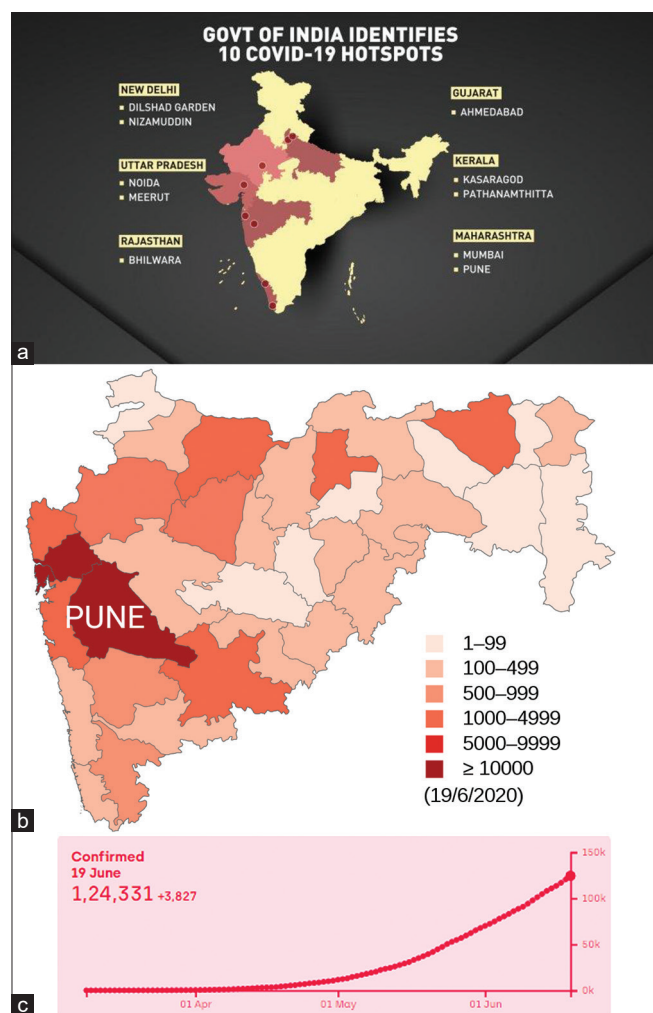
A total of 940 patients underwent cancer care at our hospital. Out of these, 864 patients who underwent surgery, chemotherapy, or radiation were included for analysis [Figure 2].

Patient characteristics regarding demographics and comorbidities are mentioned in Table 1. The follow-up period was 15–78 days, with a median of 37 days.

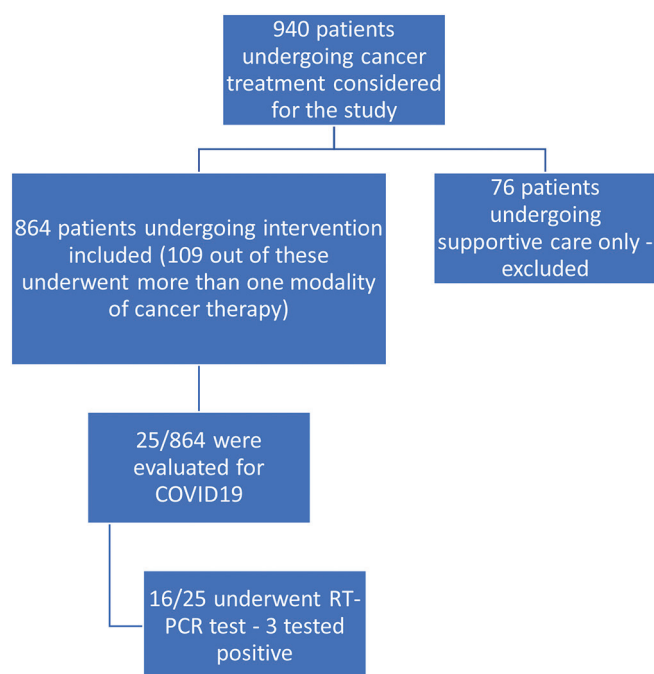
One hundred and ten patients underwent 122 surgeries, out of which 102 were major and 20 were minor surgeries. The median hospital stay was 4 days, with a range of 1–22 days. None of the surgical complications seen fitted into the profile of COVID-19 infection.

Six hundred and fifty-eight patients received chemotherapy [Table 2], and a total of 1888 cycles were administered during the study period. Bone marrow transplant was done in 11 patients. Two hundred and five patients received radiotherapy [Table 3] during the study period, and 3498 fractions were administered. Information regarding delay in initiating treatment and complications during cancer therapy is given in Table 1 and Figure 3a-c.

Surgical treatment decision had to be modified only in 1/110 (0.9%) patient of rectal cancer. She preferred surgery to neoadjuvant chemoradiotherapy because it required a greater number of hospital visits. Similarly, in 46/658 patients (6.99%) undergoing chemotherapy [Table 4] and in 37/205 (18.04%) patients



**Figure 1:** (a) COVID-19 hotspots in India (Source: Wionews.com), (b) prevalence of COVID-19 in the state of Maharashtra, with Pune being a hotspot (Source: Wikipedia), (c) rising COVID-19 patients in Pune (Source: COVID-19 India.org)



**Figure 2:** Participants' flowchart

**Table 1: Demographics and other details**

Variable	Number of patients
Sex	
Male	353
Female	511
Age (years)	
<20	65
21-40	103
41-60	398
>60	298
Comorbidity	
Diabetes mellitus	161
Ischemic heart disease	34
Hypertension	71
Bronchial asthma	11
Obesity	86
Delay due to the COVID pandemic ( $n=109/864$ ; 12.61%)	
Surgery	11
Chemotherapy	75
Radiotherapy	23
Change in treatment in view of the pandemic ( $n=84/864$ ; 9.72%)	
Surgery	1
Chemotherapy	46
Radiotherapy	37
Deaths during the study period ( $n=21/864$ ; 2.43%)	
Surgery	0
Chemotherapy	16
Radiotherapy	5
Hospital visits (each admission/radiation fraction is counted as one visit)	
Surgery	122
Chemotherapy	1888
Radiation	3498
Total	5508
Deaths in patients undergoing cancer treatment during January-February 2020 (2.24%)	26 (out of 1157 patients)

undergoing radiotherapy [Table 5], treatment had to be modified in view of the pandemic situation.

Out of the 25 patients who had symptoms suggestive of COVID, 16 underwent reverse transcription-polymerase chain reaction (RT-PCR) testing, as advised by the COVID treatment team because they fitted into the clinical picture of the disease [Figure 4]. Of the three patients (3/864, 0.34%) who tested positive, one had mild symptoms, while the other two (2/864, 0.23%) patients were suffering from advanced hemato-lymphoid malignancies and succumbed to the infection.

In the 2 months preceding the pandemic, there were 1157 admissions in the oncology department with 26 deaths (2.24%). The deaths in the study period are categorized in Figure 5. There were 21 deaths

(21/864, 2.43%) ( $P = 0.791$ ), out of which two were attributed to COVID. There was no statistically significant increase in mortality in the study period. Chi-square test was used to rule out a difference in mortality during the two periods.

## Discussion

In the current COVID pandemic in India, multispecialty hospitals play a huge role in treating COVID patients. These hospitals must also continue treating patients with other ailments during this period. Our hospital is an 800-bedded tertiary care hospital with a fully functional oncology unit.

After the announcement of the nationwide lockdown, an embargo on elective surgical procedures was imposed by the government in light of several reports of hospital-acquired COVID infections in operated patients and reporting of worse outcomes and increased mortality in COVID patients undergoing surgery.<sup>[2,3]</sup> Consequent to this, a decision to defer elective surgeries, except surgical emergencies, cancer surgeries, and cancer treatment, was taken. This viewpoint from the Indian perspective, where the rise in COVID cases was still slow, was supported by guidelines provided by one of the premier cancer institutes of the country.<sup>[4]</sup>

With a view to separate infectious patients from others, an entire building was designated for COVID patients and another one for non-COVID patients.<sup>[5]</sup>

The following standard operating procedures (SOPs) were laid down to ensure that cancer care delivery continued in the hospital without being affected by the pandemic situation:<sup>[5]</sup>

1. The number of relatives accompanying patients and outpatient visits was restricted
2. The two different buildings had separate outpatient departments, inpatient wards, operating rooms, and radiology services designated for COVID and non-COVID patients
3. Access points to the hospital were limited and they were manned by health-care workers. An effort was made to direct the flow of COVID-positive or suspected positive patients in a specific manner after screening
4. Education of health-care workers, resident doctors, and managers about specific biosafety precautions was carried out by lectures, simulations, and one-to-one meetings
5. Entrance to the chemotherapy day care was restricted, and the health-care workers were educated about social distancing and sanitization
6. Use of specific modified personal protective equipment for managing all surgical patients was made mandatory<sup>[5]</sup>
7. The radiotherapy department couch and headrest were sanitized after each use
8. Appropriate personal protective measures were adopted by the radiotherapy department personnel

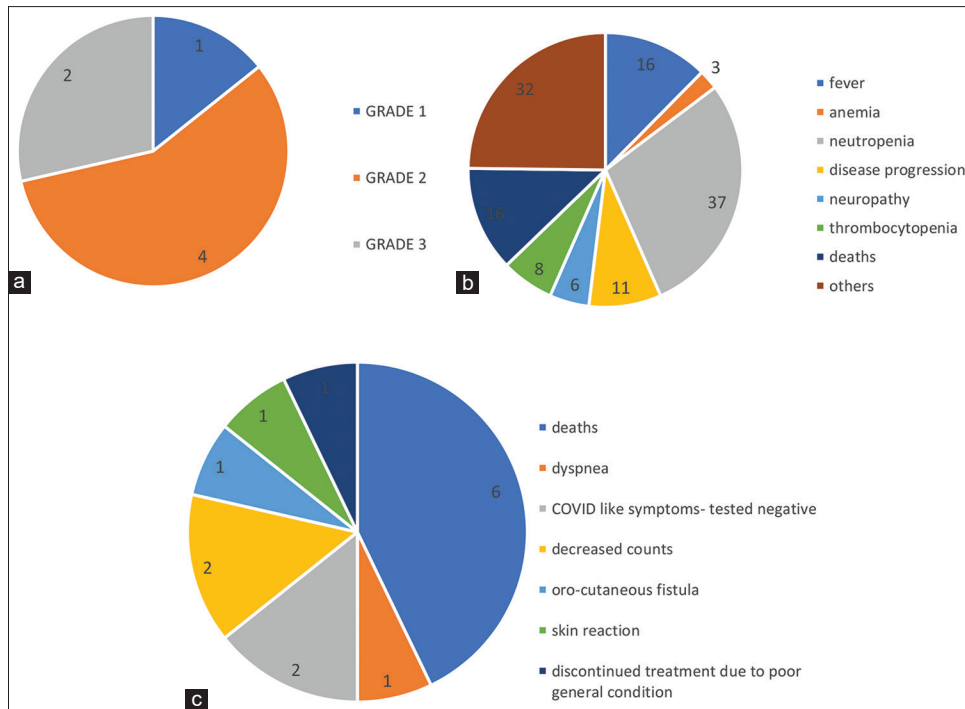


Figure 3: (a) Surgery complications (n = 7, 6.36%), (b) chemotherapy complications (n = 129, 19.66%), (c) radiotherapy complications (n = 14, 6.82%)

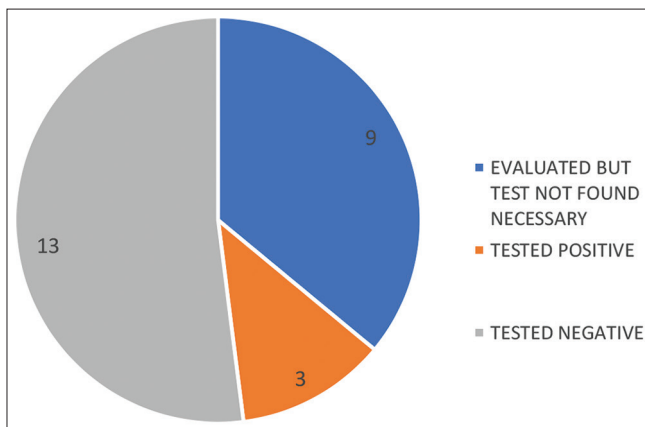


Figure 4: Patients evaluated for COVID (n = 25, 2.89%)

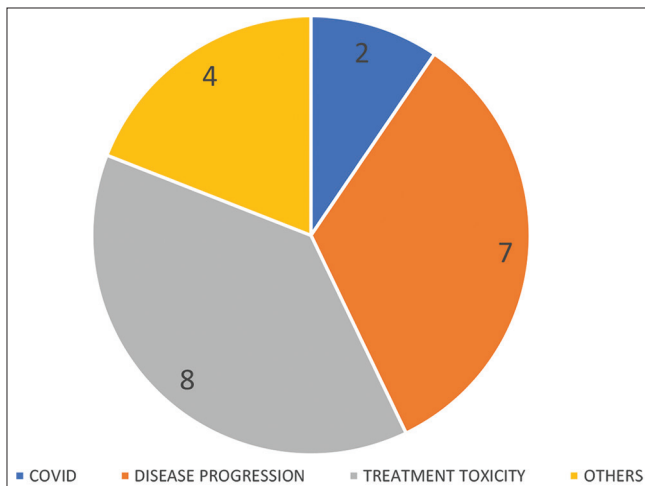


Figure 5: Deaths during the study period (n = 21, 2.43%)

9. Appointments for radiotherapy were adequately spaced out to avoid overcrowding

10. Expedited management of surgical patients by liberal use of frozen section analysis instead of paraffin section to minimize the time and visits required for a diagnosis.

Several meetings were held between the medical director and all oncologists. Some changes in the management of common cancers according to recent guidelines issued by various oncology societies were considered.<sup>[6]</sup> It was unanimously decided that the situation would be reviewed periodically and any increased rate of COVID infection in these cancer patients would warrant a change in strategy.

In accordance with the prevailing Indian Council for Medical Research guidelines,<sup>[7]</sup> a decision of not doing RT-PCR testing for all patients undergoing cancer treatment was taken. This was contradictory to suggestions by certain authors who recommended preoperative testing for all patients in light of hazardous postoperative complications in COVID-positive patients undergoing surgery.<sup>[8]</sup>

In our series, very few patients required evaluation for COVID infection despite there being multiple hospital visits (25/864, 2.893%). A scrupulous selection of patients and careful peri-operative care has helped in having no COVID-related complications or cross-infections in surgical patients. The incidence of COVID positivity in all treated cancer patients was also very low (3/864, 0.34%) as compared to the other series reported by Shrikhande *et al.*<sup>[9]</sup>

The incidence of complications in surgery and adverse events in chemotherapy and radiation (150/864, 17.36%) was comparable to historical controls, and there was no

**Table 2: Cancer site/type in patients**

	Site/type	Number of patients
Cancer site/type in all patients (n=864)	Head and neck	111
	Breast	236
	Gastrointestinal	102
	Gynecological	109
	Urological	49
	Lung	41
	Central nervous system	9
	Soft-tissue sarcomas	21
	Lymphomas	87
	Leukemias	68
Surgical patients (n=110)	Others	31
	Head and neck	27
	Breast	31
	Gastrointestinal	14
	Urological	15
	Gynecological	10
	Soft-tissue sarcomas	5
	Others	8

**Table 3: Intent of treatment**

	Intent	Number of patients
Chemotherapy (n=658)	Neoadjuvant	65
	Definitive	160
	Adjuvant	168
	Palliative	222
Radiation (n=205)	Neoadjuvant	13
	Definitive	19
	Adjuvant	105
	Palliative	68

**Table 4: Chemotherapy modifications**

Treatment modification in chemotherapy	Number of patients
Weekly to 3 weekly	27
Bi-weekly to 3 weekly	2
Change of drugs	15
Shifted to hormonal	2
Total (%)	46/658 (6.99)

**Table 5: Radiotherapy modifications**

Treatment modification in radiotherapy	Number of patients
Reduction in number of fractions	9
Reduction in number of brachytherapy fractions	8
Hypofractionation	16
Concurrent chemotherapy omitted	3
Only brachytherapy	1
Total (%)	37/205 (18.04)

unexpected increase in this number due to the impact of pandemic-related events.

Only 109/864 (12.61%) patients had to suffer a delay for starting their cancer treatments due to the pandemic situation.

This was found in concordance with a similar study by Ghosh *et al.* which mentioned that most patients in their study wanted to continue chemotherapy despite the pandemic.<sup>[10]</sup>

Only a small percentage of patients (84/864, 9.72%) underwent a change in their treatment plan. Most of these treatment plans were modified by the treating physician with a view to minimize patients' exposure to the hospital system without deviating from standard treatment guidelines.

Eleven bone marrow transplants were carried out without inflicting any additional complications on these immunocompromised patients.

Twenty-one deaths (21/864, 2.43%) were reported in our study. This was comparable to the number of deaths (26/1157, 2.24%) observed in a similar cohort of patients treated in our hospital in the 2 months of January and February 2020. Only two deaths were due to COVID infection in patients with advanced hematological malignancies.

Despite the presence of 363 comorbidity factors in 864 patients, there was no increased susceptibility to infection.

During the study period, the number of COVID cases in the city, state, and our hospital was rising exponentially [Figures 1b-c and 6].

Despite more than 5500 essential hospital visits in 864 patients during this period, there was minimal incidence of COVID infection in the study patients.

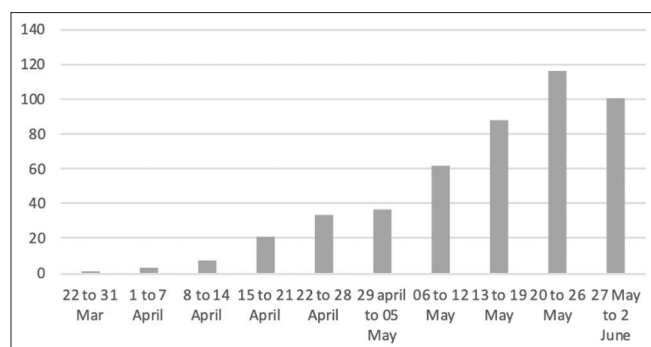
This model of effective patient segregation, separation of treatment streams, and judicious use of testing has resulted in minimal treatment delays or changes, is unlikely to have an adverse impact on the outcome of cancer, and can be effectively employed in a resource-limited setting in light of the pandemic. Possibly, the actual risk of treating cancer patients in the COVID pandemic in a COVID hospital may be much less than what has been estimated. A similar sentiment has been echoed in the correspondence by Cai *et al.*, with regard to mortality in COVID-positive patients undergoing surgery.<sup>[11]</sup>

## Conclusion

We successfully delivered cancer treatment to patients in our DCH. Only 12.61% of our patients reported a delay in treatment initiation due to the pandemic situation. We modified the treatment plan for 8.72%. The percentage of adverse effects, symptomatic COVID infection, and related mortality has been very low in our study. Thus, we would like to conclude that cancer care - a semi-emergency in itself, can be continued with due diligence even during this pandemic.

## Strength of the study

We have reported our experience of treating cancer patients in a hospital which was simultaneously managing COVID



**Figure 6: Weekly admissions of COVID-19 patients in our hospital during the study period**

patients in an area which was a COVID hotspot. To the best of our knowledge, such a combined study including surgery, chemotherapy, and radiotherapy has not been reported in the recent COVID-related literature.

We continued to manage cancer patients in a COVID hospital, without any major compromise in a pandemic situation, especially when the scientific and medical community was leaning toward postponement and change in the treatment of most cancers.<sup>[1,12]</sup> This speaks a lot about the preparedness of the hospital team as a whole, and it can be attributed to diligent training, motivation, and setting up of SOPs for each service.

### Limitations

It can be argued that most of these patients have not been tested for COVID infection unless they have had COVID-like symptoms or exposure to contacts. The clinical significance of these asymptomatic undiagnosed carriers is not properly known. In this pandemic, it is difficult to generate randomized data. In addition, there is no similar historical precedent for comparison.

The effective management of COVID and cancer patients under a single roof was possible because the graph of COVID patients in Pune and India is still on an upward curve and the health-care systems are not yet overwhelmed with cases. Upcoming months may present different challenges.

### Generalizability

Cancer treatment cannot be postponed indefinitely due to the fear of disease progression and worsening of outcomes. A judicious balance of continuing cancer treatment along with management of the pandemic needs to be considered in a resource-limited country like India, where tertiary care hospitals will have to take the initiative.

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### Conflicts of interest

There are no conflicts of interest.

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