

SPECIAL ISSUE ARTICLE

Severity and risk of COVID-19 in cancer patients: An evidence-based learning

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Abstract

The immune system of cancer patient gets compromised because of cancer therapy, surgery, and malignancy and thus the probability of infection are increased than the general patients. Immunosuppression can expose cancer patients to serious complications which can lead to delay in diagnosis and unnecessary hospitalizations that may adversely affect the prognosis of the disease. Patients who received chemotherapy or surgery within the 30 days before novel coronavirus disease pandemic have more risk of infection than the patients who had not undergone chemotherapy or surgery.

KEYWORDS

cancer, COVID-19 virus, health care, malignancy, patient care

1 | INTRODUCTION

Novel coronavirus disease (COVID-19) first observed in Wuhan, China in December 2019.¹ Symptoms of COVID-19 infection usually develops in 2 to 14 days following virus exposure, which includes cough, fever, shortness of breath, and pneumonia. Gastrointestinal, respiratory, hepatic, and neurological complications caused by COVID-19 can lead to the death of patient. Until June 2, 2020, total 6 140 934 positive cases and 373 548 deaths have been recorded worldwide due to COVID-19 infection (mortality rate: 6.32%).² WHO region wise confirmed COVID-19 cases till June 2, 2020 are: United States 2 879 316, Europe 2 159 791, Eastern Mediterranean 536 148, South-East Asia 272 512, Western Pacific 184 305, and Africa 108 121.³

Cancer patients with hematological disorders or hematopoietic stem cell transplant are at high risk of COVID-19 infections due to the multiple comorbidities and immunosuppression. Several studies reported association of COVID-19 infection in cancer patients.^{4,5} Thus, there is emergent needed to create awareness in cancer patients to protect themselves from COVID-19. This communication compiles the data of severity and risk factors for cancer patients infected with COVID-19.

2 | CASE REPORTS

Cancer patients have an immunosuppressed status, which can increase the risk of infection. Immunosuppression can expose cancer patients to serious complications due to an infection. This can delay the diagnosis and hospitalization of the patient and adversely affect medical prognosis.

A retrospective analysis of 355 Italian patients showed that 20% deaths with COVID-19 infection had active cancer. The study suggested that in the patients with leukemia, myeloma, and lymphoma who receives radiotherapy, immunotherapy, chemotherapy, antibodies, poly-ADP ribose polymerase inhibitors, protein kinase inhibitors, and bone marrow or stem cell transplants can easily vulnerable to COVID-19 infection.⁵ In a study population of 28 COVID-19 positive patients from Wuhan, China, lung cancer was most commonly diagnosed (25%) followed by esophageal cancer (14.3%) and breast cancer (10.7%). At least one or more chronic illness coexisted in 39.2% patients. Eight patients (28.6%) acquired COVID-19 infection while undergoing medical therapy and 20 patients (71.4%) acquired the infection from their populations. Majority (69.7%) of the cases were from Hankou, the starting point of the outbreak. Within 2 weeks

of diagnosis, 21.4% patients received infection during cancer treatment such as chemotherapy (10.7%), targeted therapy (7.1%), radiotherapy (3.6%), or immunotherapy (3.6%). The cancer patients showed worse conditions and poor outcomes from COVID-19 treatment. More than half patients (53.6%) developed serious events, 21.4% patients admitted to the ICU, 35.7% had life-threatening complications, and 28.6% patients died. Majority of the patients were male (60.7%) above 65 years age.⁶

Brunetti et al summarized a retrospective analysis of 1590 COVID-19 patients in 575 Chinese hospitals. One percentage population had the history of malignancy and 25% cancer patient received chemotherapy or surgery. Follow-up was done for the remaining patients. Multivariate analysis suggested association of cancer with a higher risk of severe or negative outcomes, with a median time in their development of 13 vs 43 days in noncancer patients. The study suggested that the cancer diagnosis is an important comorbidity in intensive care admissions.⁷

Cancer patients are reported to have ~3.5-fold increased risk of infection. This leads to increased demand of mechanical ventilation, ICU admission or even increased death rate compared with infected patients without cancer. The increased vulnerability of cancer patients to severe COVID-19 complications can be due to the immunosuppressed condition induced by malignancy and anticancer treatments like surgery or chemotherapy. The patients who received chemotherapy or surgery before 30 days of COVID-19 infection had a greater probability of severe incidents than patients who had not undergone chemotherapy or surgery. The history of cancer carried the greatest risk of serious complications associated with the worse COVID-19 tests.⁸

In Wuhan, China, 1524 cancer patients admitted over 6 weeks (December 2019-February 2020) had COVID-19 infection at 0.79% (12 patients), while this rate of infection was higher than the average incidence in the population served by the hospital (0.37%). The patients were sick enough to be admitted in the hospital. This study does not discuss the incidence of COVID-19 among community-dwelling cancer outpatients. Another study indicated that approximately 1% to 2% of COVID-19 infected patients had cancer in Wuhan, China. On the other hand, a higher prevalence of cancer in patients with COVID-19 infection is reported in New York City (in 5700 hospitalized COVID-19 patients, 6% had cancer). Then, 8% COVID-19 patients admitted to the intensive care unit in the Lombardy, Italy had a history of malignancy. About 20% of COVID-19 deaths across the Italy were associated with active cancer patients.^{9,10}

Wang et al conducted a retrospective cohort study considering 69 COVID-19 patients in Wuhan. The severity of disease as sole criteria was accessed using SpO₂ (obtained from pulse oximeter sensor) with a cut of 90%. The results showed that among 69 patients, four patients had a history of malignancy and only one patient had SpO₂ < 90%.¹¹ Guan et al analyzed the data of 1099 COVID-19 patients and reported that 261 patients (23.7%) with comorbidity in their cohort. Only 10 patients (0.9%) had cancer history and three patients had severe symptoms on admission while the others had mild symptoms.¹²

A comparative study consisting of 105 cancer patients and 536 patients with no history of cancer from Hubei Province, China has been reported that the cancer patients had higher death rate than non-cancer patients. The odds ratio of eight deaths was 2.17 after adjustment for covariates. The death rate was higher in patients with hematological cancer (33.33%, nine deaths) and lung cancer (18.18%, 22 deaths); however, the total number of deaths was low. Metastatic cancer patients had high risk of death (odds ratio 5.58). A study reported 107 patients out of 44 672 COVID-19 positive patients had cancer. COVID-19 infected patients with cancer had significantly higher risk of death than those without cancer (relative rate 2.93%, six deaths).¹³

Cancer patients intubated more frequently in a study population of 334 COVID-19 patients. However, the death rate did not differ significantly. It was observed that the cancer patient (66-80 years) had a high risk of intubation. Other age groups had nonsignificant difference in the risk of incubation. Cancer patients with less than 50 years of age had considerably higher mortality rate. However, COVID-19 mortality rates in cancer patients were lower than those in cancer-free patients in age groups over 50 years, although they were statistically nonsignificant.¹⁴ Mehta et al reported 218 patients with cancer infected with COVID-19 treated in a Montefiore Health system, New York. The study included 164 patients with solid tumors (75%) and 54 patients (25%) with hematologic malignancies. The cohort included 91 females (42%) and 127 males (58%). Sixty-one patients expired due to the COVID-19 infection. Mortality was 25% in all solid tumor patients and occurred at a high rate in gastrointestinal cancers (colorectal 38%), lung cancers (55%), pancreas (67%), gynecologic malignancies (38%), and upper gastrointestinal (38%). Genitourinary (15%) and breast cancer (14%) were also associated at relatively lower mortality with COVID-19 infection.¹⁵

3 | CONCLUSIONS

The cancer patients are immunocompromised due to the cancer therapy, surgery, or malignancy. Such patients are at high risk to acquire COVID-19 infection. Particular measures should be taken by the cancer patients to avoid the risk of COVID-19 infection. Such patients should stay at home, avoid hospital visits, and should opt tele or video consultation with health care providers.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

AUTHOR CONTRIBUTIONS

Rajendra Awasthi and Rishabha Malviya conceived and designed the study. Akanksha Sharma, Vinod Kumar, and Ramji Gupta were responsible for literature search and screening. Akanksha Sharma, Vinod Kumar, Rishabha Malviya, and Ramji Gupta were responsible for data collection. Rishabha Malviya and Rajendra Awasthi contributed to data interpretation. Rishabha Malviya drafted the manuscript and Rajendra Awasthi analyses and critically revised the manuscript.

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