



## COVID-19 and Cancer: Questions to Be Answered

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The World Health Organization (WHO) declared the coronavirus disease 2019 (COVID-19) outbreak to be a pandemic on March 12, 2020. In Korea, there have been 24,027 confirmed cases of COVID-19 and 420 deaths as of October 3, 2020. The clinical spectrum of COVID-19 ranges from asymptomatic infection to death. Cancer care in this pandemic has radically changed. The literature was reviewed. The COVID-19 pandemic has made it urgently necessary to profoundly re-organize cancer patients' care without compromising cancer outcomes. Several important questions in regard to COVID-19 infection in cancer patients have emerged. Are patients with cancer at a higher risk of COVID-19 infection? Are they at an increased risk of mortality and severe illness when infected with COVID-19? Does anticancer treatment affect the course of COVID-19? Based on the existing research, cancer patients with immunosuppression are vulnerable to COVID-19 infection, and cancer patients are more likely to experience severe COVID-19. However, chemotherapy and major surgery do not seem to be predictors of hospitalization or severe disease. Korean background data on patients with cancer and COVID-19 are lacking. Prospective multicenter studies on the outcomes of patients with cancer and COVID-19 should be conducted.

**Key Words:** COVID-19, Pandemics, Neoplasms, Multicenter study

The first infection with severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), which causes coronavirus disease 2019 (COVID-19) was reported in December, 2019, in Wuhan, Hubei Province, China [1,2]. Since then, it has spread throughout the world, and consequently the World Health Organization (WHO) declared the COVID-19 outbreak to be a pandemic on March 12, 2020. As of October 3, 2020, a total of 34,495,176 cases and 1,012,729 confirmed deaths have been reported across 218 countries and territories [3]. In Korea, the first case of COVID-19 was confirmed on January 20, 2020 [4], and there have been 24,027 confirmed cases of COVID-19 and 420 deaths as of October 3, 2020 [5].

The clinical spectrum of COVID-19 encompasses asymptomatic infection, mild upper respiratory tract illness, pneu-

monia that may result in respiratory failure, multi-organ failure, and death. It is believed that most infections are non-severe. Wu and McGoogan [6] reported that 81% of 44,500 laboratory-confirmed cases involved mild disease. However, the clinical outcomes of patients with severe pneumonia vary widely depending on differences in patient demographics, surge capacity of the healthcare system, medical care quality, and the case definition of COVID-19 [7]. The most common comorbid conditions in COVID-19 patients were found to be hypertension, diabetes, and smoking. Older patients (65 years or older) also showed a higher proportion of severe disease and case fatality ratio than younger age groups [8,9].

The COVID-19 pandemic has underscored the urgent need to profoundly re-organize cancer patients' care without com-

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promising cancer outcomes. Several important questions in regard to COVID-19 infection in cancer patients have emerged from the initial analyses of data from numerous studies [10]: Are patients with cancer at a higher risk of COVID-19 infection? Are they at an increased risk of mortality and severe illness when infected with COVID-19? Does anticancer treatment affect the course of COVID-19?

Cancer patients and cancer survivors with a suppressed immune system are regarded as a highly vulnerable group in the COVID-19 pandemic [11,12]. A study from Wuhan showed that hospitalized patients with hematological malignancies seemed to have a similar risk for COVID-19 as normal healthcare providers, but they showed more severe disease and a higher case fatality rate [13]. Ma et al. [14] reported that the COVID-19 infection rate was higher in cancer patients in a single-center retrospective study. Furthermore, malignancies in the immune system, such as malignant lymphomas and lymphoid leukemias, result in suppression of the immune system, making patients more vulnerable to COVID-19 infection. COVID-19 symptoms in those patients are more severe than in the general population. Children are less likely to develop severe illness in response to COVID-19 infection than adults. However, a study showed that infants and younger children (age under 6) were more likely to develop severe clinical manifestations than older children (6 years or older), due to the immaturity of their immune system [15]. Moreover, cancer patients were found to be more likely to develop severe COVID-19 than non-cancer patients. In another study, most stage IV cancer patients were shown to develop severe disease [16].

Population-based studies from China and Italy have sug-

gested a higher COVID-19 death rate in patients with cancer [17,18]. Liang et al. [19] analyzed 1,590 COVID-19 patients in a prospective nationwide study in China, and concluded that cancer patients are at a higher risk of COVID-19 and have a poorer prognosis than those without cancer. However, criticism of those conclusions followed because of the small sample size, the large amount of heterogeneity, various cancer types, highly variable disease courses, diverse treatment strategies, and the fact that half of the patients were clinically cured of cancer [7,20]. Robilotti et al. [21] reported that chemotherapy and major surgery did not seem to be predictors of hospitalization and severe disease, whereas treatment with immune checkpoint inhibitors did predict those outcomes.

The COVID-19 pandemic has rapidly changed our lifestyle. These changes, and a desire to mitigate infection risk, are having profound effects on other vital aspects of care, including the care of patients with cancer [20]. Social distancing, lockdowns, and curfews are creating major long-term issues for both curative and palliative cancer care. Difficult decisions are being made regarding the prioritization of both active treatment and palliative care, despite limited evidence that cancer is an independent risk factor for infection and mortality. Prospective nationwide studies on the outcomes of patients with cancer and COVID-19 will generate useful data to help cancer patients safely overcome this global disaster.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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