



Mini Review

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COVID-19 and the Cancer Patient

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Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is an enveloped, single-stranded RNA beta-coronavirus. SARS-CoV-2 virus is very closely related to SARS virus in that it utilizes the same angiotensin-converting enzyme 2 (ACE-2) host cell receptor [1]. SARS-CoV-2, otherwise known as COVID-19, has been identified as highly transmissible. Global confirmed cases have increased steadily since the virus' emergence in December 2019.

COVID-19 first initiates infection through its target receptor, which consists of the spike (S) glycoprotein that binds to the host angiotensin-converting enzyme 2 (ACE-2) receptor [2]. The genomic RNA of the virus is then released and undergoes replication and translation [2]. This further amplifies complement activation through direct activation, immune complexes, and toll-like receptors [2]. In severe cases, the accumulation of interleukins, neutrophils, and macrophages can lead to cytokine release syndrome [2].

There have been a number of risk factors for COVID-19 infection that have been identified such as age greater than 65 years old, obesity, immunocompromised state, diabetes, cardiovascular disease, hypertension, and cancer [2]. Symptoms of COVID-19 may vary among individuals infected, but often involve cough, headache, fatigue, and fevers or chills [1]. Individuals may also be asymptomatic.

Patients with cancer have been analyzed early on since the emergence of COVID-19 through a number of retrospective studies and cohort studies [3,4]. These studies identified that patients with cancer were considered to have an increased risk of severe events such as invasive ventilation, ICU admission, or death, compared to patients with no cancer. A prospective cohort study in conjunction

with the United Kingdom Coronavirus Cancer Monitoring Project included 800 cancer patients with symptomatic COVID-19 infection [4]. This study concluded that mortality from COVID-19 in cancer patients appeared to be driven by age, gender, and comorbidities [4]. However, it was unable to identify an increased risk of mortality if patients were on active cancer treatment or not [4].

As of 2021, there are currently two mRNA vaccines and one recombinant adenovirus vector vaccine approved for COVID-19 under Emergency Use Authorization in the United States [5-7]. Despite several vaccine candidates being in phase II/III clinical trials, there are currently no clinical trials of COVID-19 vaccine for immunocompromised patients that have been published to date. However, there are ongoing trials at this time.

The general consensus at this time from the American Society of Clinical Oncology and American Society of Hematology guidelines for patients with cancer is that they may be offered vaccination against COVID-19 as long as components of that vaccine are not contraindicated [8,9]. Per the Centers of Disease Control and Prevention, immunocompromised patients should be counseled about the unknown vaccine safety profile and effectiveness in immunocompromised populations, as well as the potential for reduced immune responses and the need to continue to follow all current guidance to protect themselves against COVID-19 [10].

Overall, patients with cancer are considered to be a vulnerable population at risk of severe infection with COVID-19. With the continually evolving nature of COVID-19, there are a number of guidelines and ongoing studies targeting this population to identify if any further conclusions or guidance can be made for this at-risk population.

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