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## Mini-Review

# Cancer and COVID-19: At Perilous Crossroads

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### ABSTRACT

Cancer has been reported in several COVID-19 patients with varying outcomes. Clinical oncology and COVID-19 treatment are both severely challenged in those patients. Although, cancer was not considered among COVID-19 comorbidities, recent observations bring significant focus to cancer's role in COVID-19 associated morbidity and mortality. Although the investigations in this direction are less in number, but the results show extremely interesting insights which can better inform the future diagnosis, treatment, and understanding of the pathophysiologies in cancers and COVID-19 in patients. Significant research, therapeutic developments, and treatment procedures need to be invested in this direction. Therefore, some of the current studies exploring this field have been presented in this mini-review.

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### Introduction

The ongoing global pandemic of COVID-19 has claimed over 1.9 million lives worldwide, according to the World Health Organization. COVID-19 stands for coronavirus disease 19, which is caused by SARS-CoV-2 or severe acute respiratory syndrome coronavirus 2. The virus contains a surface spike or S protein which interacts binds to host cell receptor ACE2 for infection. One of the important hallmarks of COVID-19 is extreme disruption of immune system leading to a cytokine storm. Hence, immune-compromised patients belong to risk populations who are very vulnerable to being infected and dying from COVID-19. One of the major diseases which compromise the immune system of patients is cancer. Although, other non-malignant diseases are reported as common comorbidities for COVID-19, but cancer is strongly implicated with morbidity and mortality in COVID-19 patients [1]. Since cancer patients are immune-compromised, comorbidities like cancers are a major hindrance to COVID-19 treatment because SARS-CoV2 infection highly disrupts the immune system. Hence, this mini-review presents the current situation of clinical oncology and COVID-19 because this area is not well explored.

### Cancer in COVID-19 Patients

Till date, a few studies have explored cancer patients afflicted with COVID-19 [2]. One publication reports 12 cohort studies on cancer

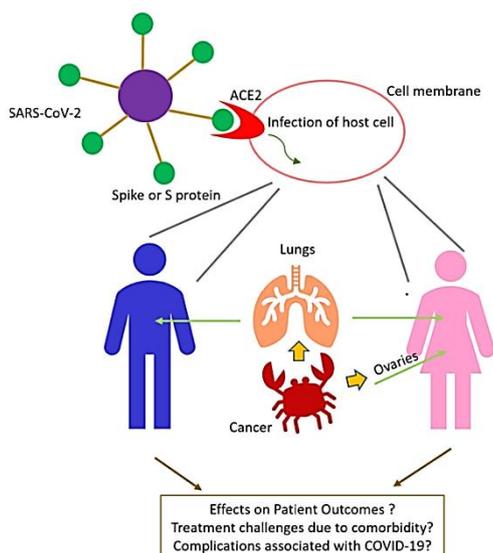
patients who tested positive for COVID-19 [1]. Among various other criteria followed here, one important factor was inclusion of clinical studies which reported COVID-19 characteristics including intensive care unit (ICU) admission and mortality. The study provides several important insights, some of which are presented below:

- i. Triage or prioritizing treatment to patients has become a necessity during the COVID-19 due to limited resources, which significantly affects cancer patients [1, 3]. Guidelines are being provided regarding COVID-19's effect on cancers of head and neck, urological tract, breast, and ovaries. It includes information on triage, prioritization, and coordinating diagnosis, surgery, radiation, treatment and immune-therapy [1, 4, 5].
- ii. Better understanding through research is required regarding cancer patients with COVID-19 to understand how cancers can cause increased mortality risk to COVID-19 patients. This is because a recent study focused on 1975 COVID-19 patients where initially 17 patients died [6]. However, only 1 person had colon cancer in addition to being 86 years old and having hypertension and diabetes mellitus [6]. Hence, in addition to COVID-19, the person had 4 other risk factors which does not clearly predict the impact of malignancy on his death. In another example, a patient with lung adenocarcinoma had COVID-19 and displayed lung edema, proteinaceous exudate, multinucleated giant cells, and pneumocytes with focal reactive

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hyperplasia and patchy inflammatory cellular infiltration [7]. Hence, it is important to delineate between the pathophysiologies of cancer and COVID-19 in these patients in order to provide them with optimum treatment. On the other hand, cancer patients have been reported to be COVID-19 positive but asymptomatic, while having high-grade serous ovarian cancer [8].

- iii. Interestingly, cancer patients under chemotherapy or surgery show an elevated risk towards severe COVID-19 symptoms compared to non-malignant individuals infected with COVID-19 [9]. The difference between cancerous and non-cancerous people is 75% versus 43%, which is striking [9]. This observation indicates that indeed cancer provides an added layer of risk to COVID-19 patients, likely due to reduced immunity in the cancer patients. At the same time, non-small-cell lung carcinoma patients with COVID-19 recovered from pneumonia either by antiviral drugs or tyrosine kinase inhibitor drugs [10, 11]. Hence, the risk assessment of cancer patients during COVID-19 is highly complicated [12]. In this direction, patients with head and neck malignancies are predicted to be at a higher risk [13, 14].



**Figure 1:** Complications associated with COVID-19 in cancer patients.

## Discussion

Patients of COVID-19 and cancer have an in-hospital mortality risk ranging from 9% to 20%, while cancer accounts for 1-2% comorbidity in China and 5-7% in the West among hospitalized COVID-19 patients [15]. It is important to first diagnose COVID-19 in cancer patients, and then design a personalized medicine-based approach for treatment because cancer patients are already immune-compromised. Lastly, a strong understanding of the causes of deaths among patients with cancers and COVID-19 is required, which is currently not well-understood (Figure 1). All items mentioned in the previous two sentences is currently challenging because of lack of knowledge and study samples. Patients with cancer and COVID-19 generally present with non-specific symptoms of COVID-19 like fever, thoracic tightness, dyspnea or breathing difficulty, low arterial oxygen saturation, ground glass

opacities, perturbations in inflammation markers and confusion [15-17]. Future processes need to focus on immunosuppression in situations like non-localizing symptoms, infections, and lymphopenia. Epidemiology, palliative and curative care options, and administration of chemotherapy, targeted immunotherapy, radiation, and surgery will be very important considerations for diagnosis, treatment, and understanding of clinical oncology of cancers and COVID-19 in the same patients.

## Conflicts of Interest

None.

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