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Comparing the Outcome of COVID-19 in Cancer and Non-Cancer Patients: An International Multicenter Study

#372

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Introduction

- Coronavirus disease 2019 (COVID-19) caused by the SARS-Cov-2 infection continues to spread worldwide with more than 38 million confirmed cases and more than one million deaths.
- A more severe infection and higher mortality from COVID-19 have been reported among patients with advanced age, several comorbidities (diabetes, cardiovascular disease) and active cancers, specifically lung cancer, hematologic malignancies and metastasis.
- Limited data suggests that the increased risk of COVID-19 in cancer patients may be attributed to advanced age, increased comorbidities and type of cancer treatments rather than cancer diagnosis itself.
- The aim of this study is to compare the clinical course, risk factors, treatments and outcomes between cancer and non-cancer patients infected with COVID-19 globally and to compare COVID-19 hematologic malignancy patients to solid tumor patients.

Methods

- An international multicenter retrospective cohort study of COVID-19 confirmed cases from January till August 2020.
- The study involved 16 centers around the world including Australia, Brazil, France, Japan, Lebanon, Singapore, South Korea, Spain and USA
- Patients were divided into two groups, cancer and non-cancer. The clinical characteristics, clinical course, hospitalization and outcomes were evaluated for a follow-up period of 30 days.
- COVID-19-associated mortality was defined as death within 30 days following a COVID-19 diagnosis.

Results

Table 1. Descriptive Characteristics

Characteristics	Non-cancer (n=860) N (%)	Cancer (n=515) N (%)	*p*-value
Age (years), median (IQR)	56 (45-69)	65 (56-74)	< .0001
Gender, male	498 (58)	259 (50)	0.006
Race (n1=733, n2=490)			< .0001
Caucasian	367 (50)	293 (60)	
Black	136 (19)	86 (18)	
Hispanic	58 (8)	81 (17)	
Asian	136 (19)	21 (4)	
Other	36 (5)	9 (2)	
Prior pulmonary disorders	165 (19)	151 (29)	< .0001
History of heart failure (n1=854, n2=505)	93 (11)	56 (11)	0.91
History of hypertension (n1=857, n2=511)	398 (46)	300 (59)	< .0001
History of diabetes melitus (n1=855, n2=508)	217 (25)	164 (32)	0.006
Smoking history (n1=780, n2=497)	179 (23)	195 (39)	< .0001
Steroids within 2 weeks of diagnosis (n1=854, n2=505)	38 (4)	118 (23)	< .0001
Labs at diagnosis			
ANC (K/ul), median (IQR)	4.15 (2.96-6.20)	4.08 (2.53-6.61)	0.19
ALC (K/ul), median (IQR)	1.01 (0.75-1.49)	0.90 (0.50-1.47)	< .0001
Platelet count (K/uL), median (IQR)	192 (151-248)	183 (124-253)	0.004
D-dimer (mcg/ml), median (IQR)	0.67 (0.41-1.39)	0.94 (0.51-2.02)	< .0001
Ferritin (ng/ml), median (IQR)	617 (251-1160)	612 (269-1361)	0.16
Hypoxia (n1=847, n2=487)	367 (43)	231 (47)	0.15
LRTI at diagnosis (n1=858, n2=494)	558 (65)	188 (38)	
Progression of URTI to LRTI	111 (13)	100 (20)	< .0001
Antiviral therapies/Immunomodulators (n1=859, n2=510)	582 (68)	322 (63)	0.08
Remdesivir	29 (3)	90 (18)	< .0001
Convalescent plasma	31 (4)	58 (11)	< .0001
IL-6 pathway inhibitors- Tocilizumab	37 (4)	56 (11)	< .0001
Steroids	205 (24)	156 (31)	0.006

Table 1. Comparing hospitalized patients with and without cancer

Table 2. Outcomes

Outcomes	Non-cancer (n=860) N (%)	Cancer (n=515) N (%)	*p*-value
Hospital admission related to COVID-19 (n1=854, n2=501)	798 (93)	435 (87)	< .0001
Non-invasive ventilation (n1=860, n2=515)	324 (38)	160 (31)	0.013
Intubated/mechanically ventilated (n1=856, n2=509)	160 (19)	82 (16)	0.23
Multi-oragan failure (n1=854, n2=507)	131 (15)	123 (24)	< .0001
Thrombotic complication (n1=853, n2=488)	59 (7)	43 (9)	0.21
Discharged on supplemental oxygen (n1=813, n2=435)	93 (11)	76 (17)	0.003
Hospital re-admission within 30 days (n1=843, n2=475)			< .0001
Yes	66 (8)	60 (13)	
NA (stayed in hospital throughout this time period)	82 (10)	100 (21)	
Death within 30 days of COVID-19 diagnosis (n1=744, n2=454)	83 (11)	100 (22)	< .0001
Hematologic Malignancy (HM) vs Solid Tumor (ST)	ST	HM	*p*-value
	(n=330) N (%)	(n=185) N (%)	
Death within 30 days of COVID-19 diagnosis (n1=284, n2=170)	66 (23)	34 (20)	0.42

Table 2. Comparing hospitalized patients with and without cancer

Table 3. Factors Associated with Mortality

Variables	OR	95% CI	*p*-value
Age (years)			< 0.0001
≤ 60	Reference		
> 60	5.54	3.34 to 9.19	
History of hypertension	1.76	1.11 to 2.78	0.016
History of heart failure	2.13	1.27 to 3.57	0.004
Hypoxia	5.02	3.18 to 7.93	< 0.0001
ALC at diagnosis (K/ul)			0.047
< 0.5	1.65	1.01 to 2.70	
≥ 0.5	Reference		
Platelet count at diagnosis (K/uL)			< 0.001
< 50	6.26	2.38 to 16.44	
≥ 50	Reference		
Progression to LRTI			0.002
No	Reference		
LRTI at diagnosis or at progression	2.25	1.34 to 3.78	
IL-6 pathway inhibitors- Tocilizumab	2.01	1.10 to 3.68	0.024
Cancer	1.60	1.04 to 2.45	0.031

Table 3. Logistic regression model of factors that were independently associated with mortality (within 30 days) in hospitalized patients. OR= Odds ratio; 95% CI= 95% Confidence Interval.

Fig.1 Survival of Hospitalized Patients

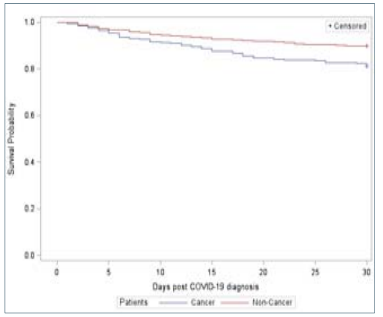

Figure 1. Kapan-Meier survival curves of hospitalized COVID-19 patients with and without cancer (p<0.0001)

Conclusions

- Even though hospitalized cancer patients received more frequently antiviral and immune-related therapy, their mortality rate was significantly higher compared to non-cancer patients.
- Advanced age, hypertension, heart failure, hypoxia, lymphopenia, thrombocytopenia and cancer are independently associated with higher mortality in COVID-19 patients.
- Cancer patients including lymphoma, myeloma, transplant and metastatic solid tumors involving the lung are at higher risk for a worse outcome including higher mortality.