Malignancy history affected the prognosis of COVID-19 patients via release of Interleukin-6

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Abstract

Background: Coronavirus disease 2019 (COVID-19), a newly erupted respiratory infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has swept across the most of countries. The laboratory characteristics of COVID-patients accompanied with cancer and the risk factors for disease progression and survival of this particular population were few reported. Methods: We enrolled 585 confirmed COVID-19 patients admitted to our hospitals with measured interleukin-6 level on admission. Laboratory tests and outcome were extracted from electronic medical records. Data was divided to cancer group and non-cancer group to explorer the risk factors of progression and survival. Findings: A total of 44 patients with different cancer type (cancer group) and 487 patients without cancer (non-cancer group) were included. Cancer group had significant higher levels of NEUT, NLR, IL-6, and CRP than non-cancer group, but lymphocyte count and ALB were lower. Cancer group showed significantly higher progression rate (42·1% vs 22·5%) and mortality (27·27% vs 11·91%) than non-cancer group. Elevated IL-6 and CRP were the risk factors associated with progression among moderate patients and death in-hospital (all $p<0·05$) in non- cancer group. This correlation was not observed in caner group. Interpretation: IL-6, CRP, NEUT, and NLR were elevated in COVID-19 patients with cancer, with lower level of LYMP and ALB. IL-6 and CRP were positively correlated with progression and poor outcome in patients without cancer. As one of combined diseases, despite malignancy history did not directly affect the prognosis of COVID-19, but it could play a role in the poorer outcome through release of IL-6 and CRP.

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Table 1: Demographic, laboratory findings, and outcomes of COVID-19 patients.

	Cancer (n=44)	**Non-cancer (n=541)**	***P* value**
Age, years	67 (IQR: 54-80.5)	59 (IQR: 42-69)	0.005
Gender			
Female (%)	20 (45.5)	294 (54.3)	0.255
Male (%)	24 (54.5)	247 (45.7)	
Time in-hospital, days	31 (IQR: 19-48.5)	21 (IQR: 13-31)	< 0.001
Laboratory findings			
WBC, $\times 10^9$/L	6.15 (IQR: 4.55-7.51)	5.37 (IQR: 4.30-6.87)	0.065
NEUT, $\times 10^9$/L	4.18 (IQR: 2.89-6.32)	3.43 (IQR: 2.59-4.80)	0.015
LYMP, $\times 10^9$/L	0.85 (IQR: 0.58-1.40)	1.26 IQR: (0.84-1.71)	0.001
NLR	5.15 (IQR: 2.53-8.52)	2.61 (IQR: 1.68-4.92)	0.001
ALB, g/L	36.8 (IQR: 31.7-42.2)	39.5 (IQR: 35.15-43.2)	0.017
IL-6, pg/L	13.9 (IQR: 6.24-32.4)	4.19 (IQR: 2.15-12.23)	< 0.001
CRP, mg/dl	2.96 (IQR: 0.38-6.32)	0.59 (IQR: 0.11-3.37)	< 0.001
Severity			
Moderate (%)	38 (86.4)	472 (87.2)	0.866
Severe/Critical (%)	6 (13.6)	69 (12.8)	
Progression among moderate patients			
Stabilization (%)	22 (57.9)	366 (77.5)	0.006
Poor progression (%)	16 (42.1)	106 (22.5)	
Outcomes			
Survivor (%)	32 (72.73)	429 (88.09)	0.001
Non-survivor (%)	12 (27.27)	58 (11.91)	

Note: Quantitative *v*ales coincided with normal distribution are expressed by mean ± SD, and median (interquartile range, IQR) for the non-normal distribution data. Frequency (percentage) was used to express the counting data.

P-values: result from Chi-square test (for gender, severity, progression among moderate patients and outcomes) and Mann-Whitney U-test (for age, time in-hospital and laboratory findings).

Abbreviations: WBC, white blood cell count; NEUT, neutrophil count; LYMP, lymphocyte count; NLR, neutrophil-to-lymphocyte ratio; ALB, serum albumin; IL-6, interleukin-6; CRP, C-reactive protein.