Association of hematological and clinical characteristics on COVID-19 patient outcomes: a pilot study

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Introduction:

The Sars-CoV2 pandemic shook the entire world. Healthcare systems are still strained as the global death toll peaks to more than 2 million to date. At our level, in a community hospital in suburban US, we aimed to explore the association between our COVID 19 patients' characteristics and outcomes.

Methods:

We performed a retrospective analysis of adult patients hospitalized with COVID-19 at Saint Francis Medical Center between January 2020 to September 2020. This study included 50 randomized patients out of the 275 Hospitalized patients with confirmed SARS-COV-2 infection via PCR.

Data was collected on baseline characteristics, comorbidities, and admission blood work. A Charlson Comorbidity Index (CCI), which predicts 10-year survival in comorbid patients, was calculated for all included participants. The primary outcome was all-cause in-hospital mortality. Secondary outcomes included need for mechanical ventilation, sepsis, and ICU admission. For normally distributed continuous data, comparisons between independent groups were made using Student's t-tests. Categorical variables were compared between groups for significance using the Chi-square test. All analyses were performed by using SAS, version 9.4 (SAS Institute, Cary, NC).

Results:

Factors	Mortality		ICU admission		Intubation	
	Adjusted odds ratio (95% CI)	p-value	Adjusted odds ratio (95% CI)	p-value	Adjusted odds ratio (95% CI)	p-value
Female gender	5.15 (0.43-61.44)	0.195	3.49 (0.24-50.78)	0.360	4.73 (0.20-109.76)	0.333
Non-white races	**0.03 (0.00-0.64)**	**0.025**	1.02 (0.07-16.07)	0.988	0.38 (0.02-9.29)	0.552
CCI ≥3	**134.54 (4.21-4298.52)**	**0.006**	15.37 (0.75-317.42)	0.077	8.79 (0.38-202.95)	0.175
Platelet count <150, x 10^3 cells/μL	6.63 (0.68-64.47)	0.103	**18.07 (1.11-294.57)**	**0.042**	5.82 (0.31-107.95)	0.237
White blood cell count <4.5, x 10^3 cells/μL	13.91 (0.07-2890.58)	0.334	5.78 (0.18-182.49)	0.319	13.38 (0.32-558.39)	0.173
Serum CRP ≥15 mg/dL	9.47 (0.90-99.90)	0.062	**45.01 (1.59-1272.47)**	**0.026**	66.39 (0.96-4615.52)	0.053
Plasma D-dimer ≥3 mg/L FEU	**147.60 (2.92-7461.94)**	**0.013**	24.14 (0.45-1293.07)	0.117	50.46 (0.42-6041.47)	0.108

Discussion:

Critical COVID 19 infection has been associated with dysfunction of multiple organ systems and its natural course has been linked to the development of refractory hypoxia, ARDS, and coagulopathy; thrombocytopenia has been consistently reported among the patients with a severe disease.

In this study we found higher rates of transfer to ICU and mortality in patient with thrombocytopenia, CCI> 3, a D- dimer ≥3 mg/L FEU, and a Serum CRP ≥15 mg/dL.

Larger studies using these markers for severe illness may help in creating a fast and effective risk calculator when triaging and admitting patients in the Emergency room. In addition, the low platelets, elevated d-dimer and CRP may be early markers of microvascular thrombosis where early anticoagulation may have some benefit. Larger studies would need to be done to determine the risk/benefit of such a high risk treatment.

Our study was limited by sample size, differences between the amount of females and males and lack of analysis of other therapies used during hospitalization.

References:

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