

INTRODUCTION

Although majority of coronavirus disease 2019 (COVID-19) cases demonstrate mild to asymptomatic disease, COVID-19 can cause serious complications and death.¹ However, risk factors for development of such complications are not well known. The purpose of this study was to identify risk factors for intubation, cardiac arrest, and death in COVID-19 patients.

MATERIALS & METHODS

A retrospective chart review of COVID-19 subjects was conducted in 185 subjects hospitalized from March to May, 2020. Data including demographics, comorbidities, laboratory results, treatments, and outcomes were collected. Data were analyzed using logistic regression models and receiver operating characteristic curves (ROC) in SAS 9.4.

Results

Of the 185 hospitalized COVID-19 subjects, 26% were intubated, 9% developed cardiac arrest, and 17% died. Subjects who exhibited elevated triglycerides, sepsis, acute respiratory distress syndrome (ARDS), acute kidney injury (AKI), elevated troponin

Table 1: Top Non-ICU Related Risk Factors for Intubation

Risk Factor	Sample Size	P-value (<0.05)	Area Under ROC Curve
Elevated triglycerides	100	<0.0001	0.791
Severe disease	184	<0.0001	0.789
Sepsis	181	<0.0001	0.766
ARDS	178	<0.0001	0.749
AKI	177	<0.0001	0.716
Troponin elevation	136	<0.0001	0.709
Altered mental status	182	0.0001	0.638
Positive blood cultures	132	0.0014	0.615
Leukocytosis	184	0.0016	0.612
Elevated ferritin	162	0.0101	0.596
Lymphopenia	185	0.0223	0.596

Definitions: Elevated Triglycerides: Triglycerides > 150 mg/dL; Severe disease: dyspnea, respiratory frequency ≥30/min, blood oxygen saturation ≤93%, partial pressure of arterial oxygen to fraction of inspired oxygen ratio <300, or lung infiltrates > 50% within 24 to 48 hrs; Positive Troponin: Troponin I > 0.03 ng/mL; Leukocytosis: WBC > 11,000 k/uL; Elevated ferritin: ferritin > 291 ng/mL; Lymphopenia: lymphocytes < 1.00 k/uL
AUC-Area Under Curve.

Table 2: Top Risk Factors for Cardiac Arrest

Risk Factor	Sample Size	P-value (<0.05)	Area Under ROC Curve
ICU days	173	0.0001	0.834
Vasopressors	182	<0.0001	0.813
Critical disease	184	0.0001	0.808
Troponin elevation	136	0.0011	0.761
ARDS	178	0.0007	0.741
Sepsis	181	0.0018	0.721
Severe disease	184	0.0095	0.719
AKI	177	0.0032	0.706
Thrombocytopenia	185	0.0024	0.669
Acute hypoxic respiratory failure	182	0.0065	0.657

Definitions: Critical Disease: Intubation, septic shock, multi-organ dysfunction or failure; Thrombocytopenia: platelets < 150 k/uL

Table 3: Top Risk Factors for Death

Risk Factor	Sample Size	P-value (<0.05)	Area Under ROC Curve
ICU days	173	<0.0001	0.792
Vasopressors	182	<0.0001	0.779
Critical disease	184	<0.0001	0.768
Age	185	<0.0001	0.754
Severe disease	184	<0.0001	0.728
Sepsis	181	<0.0001	0.709
AKI	177	<0.0001	0.708
Lymphopenia	185	0.0003	0.706
ARDS	178	0.0003	0.667
Troponin elevation	136	0.0018	0.665
Acute hypoxic respiratory failure	182	0.0075	0.656
CAD	185	0.0006	0.636
Altered mental status	182	0.0022	0.625
Thrombocytopenia	185	0.0027	0.618

levels, altered mental status, leukocytosis, lymphopenia, and elevated ferritin were more likely to require intubation ($P<0.05$; Table 1). Troponin elevation, ARDS, AKI, and thrombocytopenia were risks for cardiac arrest ($P<0.05$; Table 2). Risk of death was increased in those presenting with advanced age, critical or severe disease, lymphopenia or thrombocytopenia, and history of coronary artery disease ($P<0.05$; Table 3). Patients presenting with AKI, elevated troponin, ARDS, pressor requirements, critical disease, or sepsis were at increased risk of intubation, cardiac arrest, and death ($P<0.05$; Table 1-3).

DISCUSSION

Although research continues to provide further understanding of the novel COVID-19, mortality rates continue to remain elevated in certain parts of the world.² However, assessment of risk factors as aforementioned, could aid in clinical decision-making and predict patient outcome. As more data continues to elucidate valid scoring systems, evaluating patient risk factors for intubation, cardiac arrest, and death, could influence positive outcomes in COVID-19 patients.

REFERENCES

1. Guan WJ, Ni ZY, Hu Y, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med*. 2020. 382(18):1708-1720.
2. John Hopkins University of Medicine Coronavirus Resource Center. Morality Analyses. [Coronavirus.jhu.edu/data/mortality](https://coronavirus.jhu.edu/data/mortality). Accessed on October 4, 2020.