

# In-Hospital Mortality and Outcomes in Hospitalized Patients with Myocardial injury and COVID-19 Infection

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## BACKGROUND

Outcomes of myocardial injury (reflected by troponin elevation) in hospitalized US patients with coronavirus disease-2019 (COVID-19) suffers from absence of large sample size data. The purpose of this study was to describe the degree of myocardial injury and associated adverse outcomes in a large hospitalized laboratory-confirmed COVID-19 cohort with manual chart review.

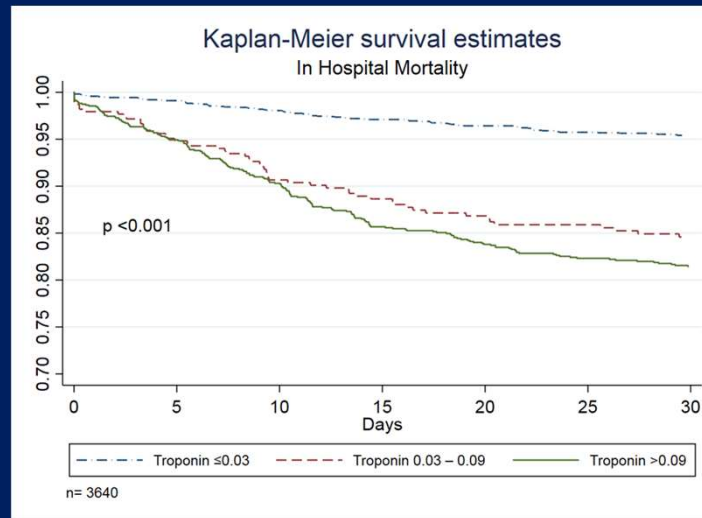
## METHODS

Patients with COVID-19 admitted to any of 19 Midwest network hospitals between Feb. 27 and Oct. 3, 2020 with troponin-I measured within 24 h of admission were included. Demographics, medical histories, admission laboratory results, and outcomes were captured from the electronic health records.

## RESULTS

- The median age was (62.2) years, with (47.7 %) females.
- Troponin was measured in 3,607 patients of a total cohort of 4,425 patients on admission (81.5%).
- Any troponin elevation was found in 1,489 patients (41.2%).
- Cardiovascular disease (CVD), including coronary/peripheral artery disease, atrial fibrillation/flutter, hypertension, diabetes, stroke and heart failure, was more prevalent in patients with higher troponin concentrations as was an elevated CRP, d-dimer and thrombocytopenia.
- A total of 409 (9.2%) patients died during hospitalization.
- After adjusting for disease severity and relevant clinical factors, even mild myocardial injury (i.e., troponin I >0.03 to 0.09 ng/ml; n=388; 10.7 %) were significantly associated with death (adjusted hazard ratio: 3.74; 95% CI: 2.79 to 5.29; p<0.001) while more significant myocardial injury (e.g., troponin I >0.09 ng/dl; n=1101; 30.5%) were significantly associated with higher risk (adjusted HR: 4.69; 95% CI: 3.69 to 5.96; p<0.001).
- Troponin elevations were also associated with admission to ICU and mechanical ventilation ( p< 0.001)

After adjusting for disease severity and relevant clinical factors, even mild myocardial injury (i.e., troponin I >0.03 to 0.09 ng/ml was found to be an independent predictor of in-hospital mortality in patients with COVID-19



In-Hospital Mortality	HR	95% CI	p value
Troponin 0.03 - 0.09	3.84	2.79 - 5.29	<0.001
Troponin >0.09	4.69	3.69 - 5.96	<0.001

Cox regression analysis



## TABLE OF PATIENT CHARACTERISTICS

	Troponin ≤0.03 n=2151	Troponin 0.03-0.09 n=388	Troponin >0.09 n=1101
Age ≥65	957 (44.5%)	278 (71.6%)	623 (56.6%)
Male	1161 (54.0%)	244 (62.9%)	603 (54.8%)
BMI			
<30	943 (47.1%)	208 (56.7%)	540 (51.1%)
≥30	1057 (52.8%)	159 (43.3%)	516 (48.9%)
Race			
Black/African American	206 (9.6%)	57 (14.7%)	194 (17.6%)
White	1600 (74.4%)	288 (74.2%)	779 (70.8%)
Other	345 (16.0%)	43 (11.1%)	128 (11.6%)
SBP <90	33 (1.5%)	14 (3.6%)	34 (3.1%)
HR ≥ 100	832 (38.7%)	135 (34.8%)	454 (41.2%)
O2<80%	70 (3.3%)	17 (4.4%)	85 (7.7%)
Hispanic Ethnicity	586 (27.2%)	58 (14.9%)	238 (21.6%)
Asthma	268 (12.5%)	45 (11.6%)	189 (17.2%)
COPD	288 (13.4%)	100 (25.8%)	230 (20.9%)
Atrial fibrillation / Flutter	254 (11.8%)	124 (32.0%)	220 (20.0%)
CAD	206 (9.6%)	98 (25.3%)	366 (33.2%)
Diabetes	429 (19.9%)	95 (24.5%)	327 (29.7%)
Dyslipidemia	1126 (52.3%)	254 (65.5%)	717 (65.1%)
Heart Failure	334 (15.5%)	171 (44.1%)	386 (35.1%)
Hypertension	1378 (64.1%)	336 (86.6%)	879 (79.8%)
Apnea	304 (14.1%)	74 (19.1%)	203 (18.4%)
Stroke	76 (3.5%)	31 (8.0%)	91 (8.3%)
PAD	223 (10.4%)	82 (21.1%)	218 (19.8%)
Cancer	202 (9.4%)	55 (14.2%)	166 (15.1%)
C reactive protein,median (IQR)	7.7 (3.3, 13)	7.3 (3.3, 13)	9.1 (3.9, 15)
Creatinine, median (IQR)	.88 (7, 1.14)	1.2 (.88, 1.88)	1.08 (.8, 1.7)
D dimer, median (IQR)	.79 (.47, 1.43)	1.06 (.65, 2.075)	1.07 (.58, 2.25)
Ferritin, median (IQR)	531 (250, 1054)	605 (270, 1170)	598 (275, 1292)
Fibrinogen, median (IQR)	524 (387, 671)	494 (380, 643)	487 (322, 657)
Lactate, median (IQR)	1.5 (1.2, 2)	1.7 (1.3, 2.4)	1.7 (1.3, 2.4)
Platelets, median (IQR)	206 (163, 268.5)	185 (147, 250)	205 (159, 266)
PTT, median (IQR)	31 (28, 34)	32 (29, 37)	31 (28, 36)
WBC (day 1), median (IQR)	6.6 (5, 9)	7.35 (5.3, 9.6)	7.3 (5.4, 10.5)
NT pro-BNP, mean (SD)	5.309963 (1.822321)	7.36058 (1.751734)	6.818572 (2.257623)
All Positive Cultures	134 (6.2%)	41 (10.6%)	115 (10.4%)
Ventilator	175 (8.1%)	67 (17.3%)	227 (20.6%)
ICU	461 (21.4%)	163 (42.0%)	479 (43.5%)
In Hospital Mortality	98 (4.6%)	61 (15.7%)	211 (19.2%)

## CONCLUSION

Myocardial injury is prevalent among patients hospitalized with COVID-19 and seen largely in patients with CVD. Troponin elevation among patients hospitalized with COVID-19 is associated with higher risk of mortality.

## DISCLOSURE INFORMATION

All authors have no financial conflict of interest related to this study.