

# Prognostic significance of troponin I elevation and other biomarkers in patients hospitalized with COVID-19

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## BACKGROUND

Troponin I (TnI) elevation has been found to portend worse outcomes in patients with hospitalized with COVID-19 infection. We analyzed initial TnI level as a prognostic indicator compared to other biomarkers in a large cohort of patients from 4 hospitals comprising the Mainline Health System (MLHS).

## METHODS

We identified 1424 adult patients, admitted to MLHS hospitals between 03/05/2020 and 05/31/2020 with COVID-19 infection. We compared outcomes of patients with initial abnormal TnI ( $\geq 0.05$ ng/ml, defined as  $>99^{\text{th}}$  percentile upper reference limit) to patients with normal TnI levels using multivariable regression. Akaike information criterion (AIC) was used to compare Cox proportional hazard models of troponin I with other biomarkers. Smaller value indicates better model fit.

## RESULTS

At baseline, patients with initial abnormal TnI were older in age (median(IQR) 80y (70-88) vs 68y (56-81)  $p < .0001$ ), likely male (32% vs 25%,  $p = 0.016$ ), with higher prevalence of coronary artery disease (CAD) (4.4% vs 1.7%  $p = 0.0014$ ). In models adjusting for age, gender, BMI, history of CAD, diabetes mellitus, hypertension, heart failure, stroke, abnormal TnI was associated with 2.5 days longer hospitalization ( $p = 0.0015$ ), higher odds of ICU admission (OR 2.5, 95% CI 1.8-3.3  $p < 0.001$ ). Using AIC to compare multiple Cox proportional hazard models, TnI (3054) was a better predictor of death during hospitalization, than creatinine (3210) and hemoglobin (3209) but not C-reactive protein (CRP) (2819) or lactate (2859).

## CONCLUSION

Abnormal TnI was associated worse outcomes in hospitalized COVID patients. However, CRP and lactate were better predictors of adverse outcomes than TnI, indicating systemic inflammation as the possible pathognomonic basis of worse outcomes.



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# CRP and Lactate individually are better predictors of mortality than Troponin I

# Abnormal Troponin I adds additional prognostication for in hospital death

# Elevated Troponin I is associated with a 2.5 day increase in length of stay, and increased likelihood of ICU admission

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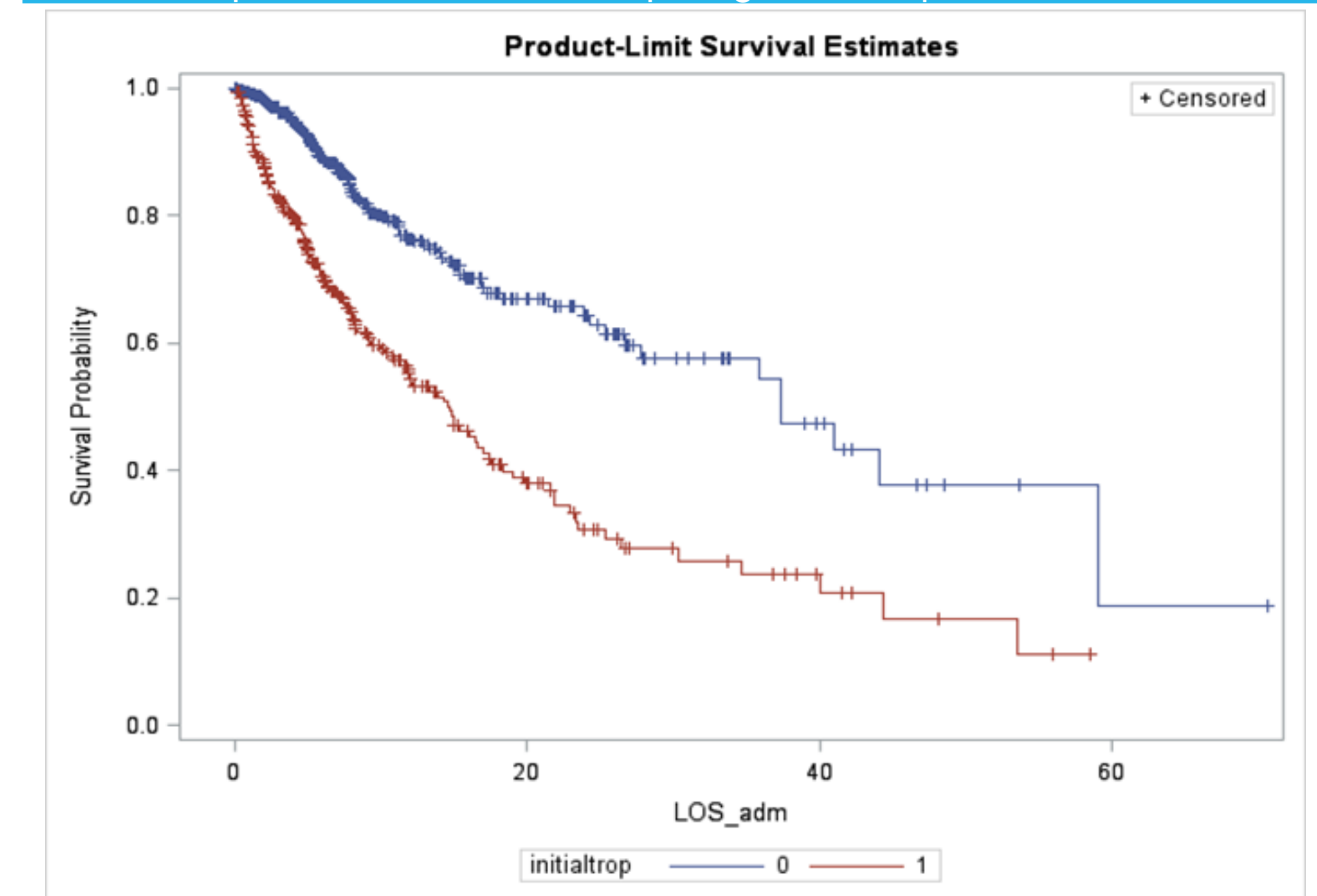
## DISCUSSION

- Troponin elevation may indicate ventricular dysfunction in the setting of myocardial inflammation. Elevated NT pro-BNP levels have also been associated with worse in-hospital outcomes.(1)
- Although abnormal CRP and Lactate are alone better predictors of in-hospital mortality, the addition of troponin I should be considered for all admitted patients regardless of known history of coronary artery disease.

## Comparison of Cox Proportional models-LOS/Death

Model	AIC
Age CAD DM HTN CHF CVA BMI Gender	3231.435
Age CAD DM HTN CHF CVA BMI Gender+ Positive Troponin	3054.707
Age CAD DM HTN CHF CVA BMI Gender+ Initial Troponin value	3079.384
Age CAD DM HTN CHF CVA BMI Gender+ Peak Troponin value	3076.619
Age CAD DM HTN CHF CVA BMI Gender+ Initial Creatinine	3210.958
Age CAD DM HTN CHF CVA BMI Gender+ Initial Hemoglobin	3209.531
Age CAD DM HTN CHF CVA BMI Gender+ Initial lactate	2859.827
Age CAD DM HTN CHF CVA BMI Gender+ CRP	2819.917
Age CAD DM HTN CHF CVA BMI Gender+ CRP+lactate	2532.805
Age CAD DM HTN CHF CVA BMI Gender+ CRP+ lactate + Troponin	2432.857

## Kaplan Meier Survival comparing initial Troponin I values



Initial Troponin I values: normal (blue), abnormal (red).

## Author Disclosures and References

Author Disclosures: None

1. Pranata R, Huang I, Lukito AA, Raharjo SB. Elevated N-terminal pro-brain natriuretic peptide is associated with increased mortality in patients with COVID-19: systematic review and meta-analysis. *Postgrad Med J.* 2020;96(1137):387-391. doi:10.1136/postgradmedj-2020-137884