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ASSOCIATION OF CARDIAC BIOMARKERS WITH OUTCOME OF COVID-19 PATIENTS - A DESCRIPTIVE STUDY ATA TERTIARY CARE CENTRE IN INDIA

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ABSTRACT

Aim and Background: Coronavirus disease (COVID-19) is caused by Severe acute respiratory syndrome- Corona virus 2 (SARS-COV2) and represents the causative agent of a potentially fatal disease that has reached a pandemic level. Cardiovascular complications are common in COVID -19 patients like any other influenza virus and includes- myocarditis, acute myocardial infarction, and exacerbation of heart failure (HF), all contributing to increased mortality. This descriptive study aims to evaluate the incidence of cardiac biomarker elevation in symptomatic COVID -19 patients and the association of troponin/NT-proBNP (N-terminal pro-hormone Brain natriuretic peptide) levels with clinical outcome. **Materials and methods:** This was a hospital based retrospective study conducted at a Cardiology Unit of a tertiary care hospital. All patients admitted in past 6 months with diagnosis of COVID 19 were recruited. Duration of the study was of 1 month. **Results:** Among 131 patients 58% were males and 42% were females. 16.79% died during the study and 35.11% of patients were discharged from hospital. 42.75% of study population had severe form of COVID. 64.89% of patients required oxygen supplementation and 16.79% needed ventilator support for survival. 22.9% of patients had hypertension whereas 16.79% had diabetes as co morbidities. P values of patients needing oxygen requirement or ventilation is non-significant in all the categories. **Conclusion:** Our study showed no significant association between troponin and BNP values with the severity of Covid-19 disease. BNP values were raised in only 1-2 patients requiring oxygen and ventilator support. Large sample size is needed to confirm this study.

INTRODUCTION

Coronavirus disease (COVID-19) is caused by SARS-COV2, from corona virus family and represents the causative agent of a potentially fatal disease that resulted into a pandemic.[1] SARSCoV-2 is a novel single-stranded enveloped RNA virus which is known to cause fatal viral pneumonia A total of seven coronaviruses have been found to cause disease in humans.[2] Four of these coronaviruses continually circulate in the human population and produce the generally mild symptoms of the common cold in adults and children worldwide: - OC43, -HKU1, HCoV-229E, -NL63.[3] About 15% of the common cold in humans is attributable to coronaviruses, rest 85% is caused by rhinoviruses.[4]

There are three human coronaviruses that causes severe illnesses: MERS-CoV (Middle east respiratory syndrome), SARS-CoV and SARS-CoV-2.[5] SARS-CoV-2 is the causative agent of the ongoing pandemic, shares 89-96% nucleotide identity with bat coronaviruses. It resembles SARS and MERS and is believed to have originated from bats. It is believed that SARS-CoV-2 moved from bats to an intermediate host (possibly a Malayan Pangolin, with which it shares 91% nucleotide identity) and was then transmitted to humans.[6]

Cardiovascular complications of SARS-CoV-2 are like any other influenza virus and includes- myocarditis, acute myocardial infarction, and exacerbation of heart failure (HF), all leading to increased mortality. The epidemiological studies of SARS and MERS revealed the cardiovascular complications of corona viruses. During 2003 SARS outbreak, a total of 8096 people in 29 countries were affected and 774 of them died (around 10%).[7] The SARS outbreak cost global economic loss of $40 billion over a span of 6 months.[8,9]

There is a paucity of literature about COVID 19 related cardiac complications in Indian population, hence studies are required tothrow light onto this perspective.

The present descriptive study aims to estimate the incidence of cardiac biomarker elevation in symptomatic COVID -19 patients and the association of troponin/NT-proBNP levels with clinical outcome.

MATERIALS AND METHODS

This was a hospital based retrospective study conducted in Department of cardiology unit, at tertiary care

hospital. All patients admitted with a positive diagnosis of COVID 19 were recruited within a period of past 6 months. Duration of the study was for a period of 1 month. Clearance was obtained from independent ethics committee.

Patients above 18 years of age (males and females) with confirmed diagnosis of COVID 19 were included in the study. Patients with co-morbid non-cardiac conditions causing raised troponin/NT-proBNP levels were excluded. The primary objective of the study was to estimate the incidence of cardiac biomarker elevation in symptomatic COVID -19 patients. The secondary objective was to assess the level of troponin level/NT-pro BNP with clinical outcomes in COVID- 19 patients.

All the data were collected from the case files stored in the record room of the hospital. The Primary endpoint was the incidence of cardiac biomarker elevation in symptomatic COVID -19 patients. The Secondary endpoint was the association of troponin/NT-proBNP levels with clinical outcome.

Variables such as Demographics, history of concomitant diseases like diabetes, hypertension, ischemic heart disease, NYHA class(New york heart association classification for heart failure) Pulse, Blood Pressure, weight, height & BMI (body masss index), Routine hematological investigation (Hb, liver and renal function test), Troponin levels, Past/history of heart failure or any other medical illness, Concomitant medications –were collected.

Statistical Analysis
All statistical analyses were performed using commercially available software Statistics Package for the Social Sciences (SPSS). Demographic variables were summarized using descriptive statistics. Prevalence was given in percentage. Continuous variables were summarized using mean ($\pm$ SD). Parametric data were analyzed using independent sample t-test and non-parametric data were analyzed using Mann Whitney U

test. Categorical variables were analyzed using Chi Square test. A p value <0.05 was considered significant for all tests.

RESULTS
This was a hospital based descriptive study which included 131 patients out of which 58% were males and 42% were females. Total 16.79% patients died and 35.11% of patients were discharged from hospital. 42.75% of study population had severe form of COVID. 64.89% of patients required oxygen supplementation and 16.79% needed ventilator support. 22.9% of patients had hypertension whereas 16.79% had diabetes as co morbidities. (Table 1)

Among 131 patients, 0.76% of patients had probability of myocardial infarction and 1.53% had myocardial infarction. Possibility of heart failure with > 100 pg/ml Brain natriuretic peptide (BNP) was 62.60%. (Table 2)

Troponin level could not predict the probability of myocardial infarction in study population (Table 3). Level of troponin did not t show any correlation with severity of the disease (Table 4, 5, 6)

Troponin levels could not predict the requirement of oxygen or ventilatory support (Table 7, 8). Despite normal troponin level, 65% patient required oxygen and 16% patient required ventilator. There was no association between extended hospital stay with increased troponin levels (Table 9,10, 11).

Patient with BNP >100 pg/ml had more mortality as compared with patient with normal BNP level. There was no significant association between severity of Covid19 and increase in BNP levels (Table 13, 14, 15). Though the oxygen requirement was more in patients having higher level of BNP, but P value was not significant (Table 16). Ventilatory requirement and prolonged hospital stay was not associated with higher BNP level.

Table 1: Summary Statistics of Demographics.

PARAMETER	COUNT (N=131)
AGE	
N	131
MEAN	49.81
GENDER, N (%)	
MALE	77 (58.78 %)
FEMALE	54 (41.22 %)
OUTCOME, N (%)	
DISCHARGE FROM HOSPITAL	109 (83.21 %)
DEATH	22 (16.79 %)
SEVERITY, N (%)	
MILD	46 (35.11 %)
MODERATE	29 (22.14 %)
SEVERE	56 (42.75 %)
OXYGEN REQUIREMENT, N (%)	

PARAMETER	COUNT (N=131)
No	46 (35.11 %)
Yes	85 (64.89 %)
VENTILATOR NEEDED, N (%)	
No	109 (83.21 %)
Yes	22 (16.79 %)
DURATION OF STAY (DAYS)	
N	34
MEAN	6.35
COMORBIDITY CONDITIONS, N (%)	
HTN	30 (22.90 %)
DM	22 (16.79 %)
TB	5 (3.82 %)
CKD	2 (1.53 %)
HEART FAILURE	1 (0.76 %)
CAD	1 (0.76 %)
COPD	1 (0.76 %)
AF	1 (0.76 %)
NIL	88 (67.17 %)
*TB: Tuberculosis *CAD: Coronary Artery Disease *COPD: Chronic Obstructive Pulmonary Disease *DM: Diabetes Mellitus *HTN: Hypertension *CKD: Chronic Kidney Disease *AF: Atrial Fibrillation	

Table 2: Summary Statistics of incidence of cardiac biomarker elevation in symptomatic COVID -19 Positive patients.

PARAMETER	COUNT (N=131)
TROPONIN, N (%)	
NORMAL RANGE (<0.04 NG/ML)	128 (97.71 %)
PROBABLE **MYOCARDIAL INFARCTION** (0.04 - 0.39 NG/ML	1 (0.76 %)
MYOCARDIAL INFARCTION (>0.39 NG/ML)	2 (1.53 %)
BRAIN NATRIURETIC PEPTIDE (BNP), N (%)	
HEALTHY RANGE (<100 PG/ML)	49 (37.40 %)
POSSIBILITY OF HEART FAILURE (>100 PG/ML)	82 (62.60 %)

Table 3: Summary Statistics of Association of Troponin with Mortality in COVID-19 Patient.

PARAMETER	RESULT – MORTALITY		ODDS RATIO (95 % CI)	P – Value
	YES (n = 22)	NO (n = 109)		
Troponin				
Normal Range (<0.04 ng/ml)	22 (100.00 %)	106 (97.25 %)	1.0283 (0.5376, 1.9671)	1.0000
Probable myocardial infarction (0.04 - 0.39 ng/ml	0 (0.00 %)	1 (0.91 %)	NA	NA
myocardial infarction (>0.39 ng/ml)	0 (0.00 %)	2 (1.84 %)	NA	NA
*NA: Not Applicable				

Table 4: Summary Statistics of Odds Ratio for Troponin based on COVID-19 Patient Severity (MILD).

PARAMETER	RESULT – SEVERITY (MILD)		ODDS RATIO (95 % CI)	P – Value
	YES (n = 46)	NO (n = 85)		
Troponin				
Normal Range (<0.04 ng/ml)	45 (97.82 %)	83 (97.64 %)	1.0018 (0.6014, 1.6688)	1.0000
Probable myocardial infarction (0.04 - 0.39 ng/ml	1 (2.18 %)	0 (0.00 %)	NA	NA
myocardial infarction (>0.39 ng/ml)	0 (0.00 %)	2 (2.36 %)	NA	NA
*NA: Not Applicable				

Table 5: Summary Statistics of Odds Ratio for Troponin based on COVID-19 Patient Severity (MODERATE).

PARAMETER	RESULT – SEVERITY (MODERATE)		ODDS RATIO (95 % CI)	P – Value
	YES (n = 29)	NO (n = 102)		
Troponin				
Normal Range (<0.04 ng/ml)	29 (100.00 %)	99 (97.05 %)	1.0303 (0.5744, 1.8481)	1.0000
Probable myocardial infarction (0.04 - 0.39 ng/ml	0 (0.00 %)	1 (0.98 %)	NA	NA
myocardial infarction (>0.39 ng/ml)	0 (0.00 %)	2 (1.97 %)	NA	NA
*NA: Not Applicable				

Table 6: Summary Statistics of Odds Ratio for Troponin based on COVID-19 Patient Severity (SEVER).

PARAMETER	RESULT – SEVERITY (SEVER)		ODDS RATIO (95 % CI)	P – Value
	YES (n = 56)	NO (n = 75)		
Troponin				
Normal Range (<0.04 ng/ml)	54 (96.42 %)	74 (98.67 %)	0.9773 (0.597, 1.5998)	1.0000
Probable myocardial infarction (0.04 - 0.39 ng/ml	0 (0.00 %)	1 (1.33 %)	NA	NA
myocardial infarction (>0.39 ng/ml)	2 (3.58 %)	0 (0.00 %)	NA	NA
*NA: Not Applicable				

Table 7: Summary Statistics of Association of Troponin with Oxygen Requirement in COVID-19 Patient.

PARAMETER	RESULT – OXYGEN REQUIREMENT		ODDS RATIO (95 % CI)	P – Value
	YES (n = 85)	NO (n = 46)		
Troponin				
Normal Range (<0.04 ng/ml)	83 (97.65 %)	45 (97.83 %)	0.9982 (0.5992, 1.6627)	1.0000
Probable myocardial infarction (0.04 - 0.39 ng/ml	0 (0.00 %)	1 (2.17 %)	NA	NA
myocardial infarction (>0.39 ng/ml)	2 (2.35 %)	0 (0.00 %)	NA	NA
*NA: Not Applicable				

Table 8: Summary Statistics of Association of Troponin with Ventilator Needed in COVID-19 Patient.

PARAMETER	RESULT – VENTILATOR NEEDED		ODDS RATIO (95 % CI)	P – Value
	YES (n =22)	NO (n = 109)		
Troponin				
Normal Range (<0.04 ng/ml)	22 (100.00 %)	106 (97.25 %)	1.0283 (0.5376, 1.9671)	1.0000
Probable myocardial infarction (0.04 - 0.39 ng/ml	0 (0.00 %)	1 (0.91 %)	NA	NA
myocardial infarction (>0.39 ng/ml)	0 (0.00 %)	2 (1.84 %)	NA	NA
*NA: Not Applicable				

Table 9: Summary Statistics of Odds Ratio for Troponin Based on Extended Hospital Stay of ≤7 days.

PARAMETER	RESULT – HOSPITAL STAY OF ≤ 7 DAYS		ODDS RATIO (95 % CI)	P – Value
	YES (n = 23)	NO (n = 11)		
Troponin				
Normal Range (<0.04 ng/ml)	23 (100.00 %)	10 (90.91 %)	1.1 (0.3915, 3.091)	1.0000
Probable myocardial infarction (0.04 - 0.39 ng/ml	0 (0.00 %)	0 (0.00 %)	NA	NA
myocardial infarction (>0.39 ng/ml)	0 (0.00 %)	1 (9.09 %)	NA	NA
*NA: Not Applicable				

Table 10: Summary Statistics of Odds Ratio for Troponin Based on Extended Hospital Stay of 8-14 days.

PARAMETER	RESULT – HOSPITAL STAY OF 8-14 DAYS		ODDS RATIO (95 % CI)	P – Value
	YES (n = 10)	NO (n = 24)		
Troponin				
Normal Range (<0.04 ng/ml)	10 (100.00 %)	23 (95.84%)	1.0435 (0.3664, 2.9718)	1.0000
Probable myocardial infarction (0.04 - 0.39 ng/ml	0 (0.00 %)	0 (0.00 %)	NA	NA
myocardial infarction (>0.39 ng/ml)	0 (0.00 %)	1 (4.16 %)	NA	NA
*NA: Not Applicable				

Table 11: Summary Statistics of Odds Ratio for Troponin Based on Extended Hospital Stay of 15-21 days.

PARAMETER	RESULT – HOSPITAL STAY OF 15-21 DAYS		ODDS RATIO (95 % CI)	P – Value
	YES (n = 1)	NO (n = 33)		
Troponin				
Normal Range (<0.04 ng/ml)	0 (0.00 %)	33 (100.00 %)	NA	NA
Probable myocardial infarction (0.04 - 0.39 ng/ml	0 (0.00 %)	0 (0.00 %)	NA	NA
myocardial infarction (>0.39 ng/ml)	1 (100.00 %)	0 (0.00 %)	NA	NA
*NA: Not Applicable				

Table 12: Summary Statistics of Association of Brain Natriuretic Peptide (BNP) with Mortality in COVID-19 Patient.

PARAMETER	RESULT – MORTALITY		ODDS RATIO (95 % CI)	P – Value
	YES (n = 22)	NO (n = 109)		
Brain Natriuretic Peptide (BNP)				
Healthy Range (<100 pg/ml)	7 (31.82 %)	42 (38.53 %)	0.8258 (0.3284, 2.0763)	0.8212
Possibility of Heart Failure (>100 pg/ml)	15 (68.18 %)	67 (61.47 %)	1.1092 (0.5381, 2.2866)	0.8531

Table 13: Summary Statistics of Odds Ratio for Brain Natriuretic Peptide (BNP) based on COVID-19 Patient Severity (MILD).

PARAMETER	RESULT – SEVERITY (MILD)		ODDS RATIO (95 % CI)	P – Value
	YES (n = 46)	NO (n = 85)		
Brain Natriuretic Peptide (BNP)				
Healthy Range (<100 pg/ml)	20 (43.48 %)	29 (34.12 %)	1.2744 (0.65, 2.4985)	0.4917
Possibility of Heart Failure (>100 pg/ml)	26 (56.52 %)	56 (65.88 %)	0.8579 (0.4768, 1.5437)	0.6568

Table 14: Summary Statistics of Odds Ratio for Brain Natriuretic Peptide (BNP) based on COVID-19 Patient Severity (MODERATE).

PARAMETER	RESULT – SEVERITY (MODERATE)		ODDS RATIO (95 % CI)	P – Value
	YES (n = 29)	NO (n = 102)		
Brain Natriuretic Peptide (BNP)				
Healthy Range (<100 pg/ml)	10 (34.48 %)	39 (38.24 %)	0.9019 (0.402, 2.0232)	0.8422
Possibility of Heart Failure (>100 pg/ml)	19 (65.52 %)	63 (61.76 %)	1.0608 (0.5492, 2.0488)	0.8676

Table 15: Summary Statistics of Odds Ratio for Brain Natriuretic Peptide (BNP) based on COVID-19 Patient Severity (SEVER).

PARAMETER	RESULT – SEVERITY (SEVER)		ODDS RATIO (95 % CI)	P – Value
	YES (n = 56)	NO (n = 75)		
Brain Natriuretic Peptide (BNP)				
Healthy Range (<100 pg/ml)	19 (33.93 %)	30 (40.00 %)	0.8482 (0.4337, 1.6591)	0.7345
Possibility of Heart Failure (>100 pg/ml)	37 (66.07 %)	45 (60.00 %)	1.1012 (0.6316, 1.9199)	0.7773

Table 16: Summary Statistics of Association of Brain Natriuretic Peptide (BNP) with Oxygen Requirement in COVID-19 Patient.

PARAMETER	RESULT – OXYGEN REQUIREMENT		ODDS RATIO (95 % CI)	P – Value
	YES (n = 85)	NO (n = 46)		
Brain Natriuretic Peptide (BNP)				
Healthy Range (<100 pg/ml)	29 (34.12 %)	20 (43.48 %)	0.7847 (0.4002, 1.5385)	0.4917
Possibility of Heart Failure (>100 pg/ml)	56 (65.88 %)	26 (56.52 %)	1.1656 (0.6478, 2.0973)	0.6568

Table 17: Summary Statistics of Association of Brain Natriuretic Peptide (BNP) with Ventilator Needed in COVID-19 Patient.

PARAMETER	RESULT – VENTILATOR NEEDED		ODDS RATIO (95 % CI)	P – Value
	YES (n = 22)	NO (n = 109)		
Brain Natriuretic Peptide (BNP)				
Healthy Range (<100 pg/ml)	7 (31.82 %)	42 (38.53 %)	0.8258 (0.3284, 2.0763)	0.8212
Possibility of Heart Failure (>100 pg/ml)	15 (68.18 %)	67 (61.47 %)	1.1092 (0.5381, 2.2866)	0.8531

Table 18: Summary Statistics of Odds Ratio for Brain Natriuretic Peptide (BNP) Based on Extended Hospital Stay of ≤7 days.

PARAMETER	RESULT – HOSPITAL STAY OF ≤ 7 DAYS		ODDS RATIO (95 % CI)	P – Value
	YES (n = 23)	NO (n = 11)		
Brain Natriuretic Peptide (BNP)				
Healthy Range (<100 pg/ml)	6 (26.09 %)	2 (18.18 %)	1.4348 (0.2483, 8.2916)	1.0000
Possibility of Heart Failure (>100 pg/ml)	17 (73.91 %)	9 (81.82 %)	0.9034 (0.3064, 2.6635)	1.0000

Table 19: Summary Statistics of Odds Ratio for Brain Natriuretic Peptide (BNP) Based on Extended Hospital Stay of 8-14 days.

PARAMETER	RESULT – HOSPITAL STAY OF 8-14 DAYS		ODDS RATIO (95 % CI)	P – Value
	YES (n = 10)	NO (n = 24)		
Brain Natriuretic Peptide (BNP)				
Healthy Range (<100 pg/ml)	2 (20.00 %)	6 (25.00 %)	0.8 (0.1373, 4.6601)	1.0000
Possibility of Heart Failure (>100 pg/ml)	8 (80.00 %)	18 (75.00 %)	1.0667 (0.3506, 3.245)	1.0000

Table 1: Summary Statistics of Odds Ratio for Brain Natriuretic Peptide (BNP) Based on Extended Hospital Stay of 15-21 days.

PARAMETER	RESULT – HOSPITAL STAY OF 15-21 DAYS		ODDS RATIO (95 % CI)	P – Value
	YES (n = 1)	NO (n = 33)		
Brain Natriuretic Peptide (BNP)				
Healthy Range (<100 pg/ml)	0 (0.00 %)	8 (24.24 %)	NA	NA
Possibility of Heart Failure (>100 pg/ml)	1 (100.00 %)	15 (45.45 %)	2.2 (0.1288, 37.5892)	1.0000
*NA: Not Applicable				

DISCUSSION

This descriptive study aims to estimate the incidence of cardiac biomarker elevation in symptomatic COVID -19 patients and the association of troponin/NT-proBNP levels with clinical outcome.

Rise and/or fall of troponin levels indicating myocardial injury is common among patients with acute respiratory infections and is associated with disease severity. Abnormal troponin values are common in COVID-19 infection when tested with a high sensitivity cardiac troponin (hs-cTn) assay.

Natriuretic peptides are biomarkers of myocardial stress and are frequently elevated among patients with severe respiratory illnesses typically in the absence of elevated filling pressures or clinical heart failure. Much like troponin, elevation of BNP or NT-pro BNP is associated with an unfavorable course among patients with ARDS.

Troponins and brain natriuretic peptides (BNP) level changes are complimentary in COVID-19 patients with cardiac involvement.

Patients with COVID-19 often demonstrate significant elevation of BNP or NT-pro BNP. The significance of these findings is uncertain and should not trigger a diagnosis or treatment of heart failure unless there is concrete clinical evidence.

The incidence of myocardial injury or myocarditis has been more or less similar in all the mentioned studies. These studies reported highest mortality rates in patients having elevated TnT levels with cardiovascular diseases as co-morbidities. Mortality rates were considerable even in patients with elevated TnT levels without cardiovascular disease.

A systematic review and meta-analysis done by Wen An et al in 2021 found out that high-sensitive cardiac troponin T (SMD = 0.93 U/L, 95% CI = 0.21–1.65, P = 0.012) was associated with disease severity in COVID-19 infection.[10]

Similarly a study done by Li et al in 2021 found out that BNP together with hs-TNI (High sensitive troponin I), α-HBDH (α-hydroxybutyrate dehydrogenase), CK-MB (Creatinine kinase - MB) and LDH (lactate dehydrogenase) act as a prognostic biomarker in COVID-19 patients with or without pre-existing coronary artery disease. This study also showed positive results with respect to BNP (42 [24.6%] vs 7 [1.1%]) and hs-TNI (38 [48.1%] vs 6 [1.0%]) in detecting high risk COVID patients with CVD's.[11]

A study done by Stefanini et al in 2020 found out that an early detection of elevated hs-TnI and BNP predicts mortality in patients with COVID-19. The rate of mortality was higher in patients with elevated hs-TnI (22.5%, OR 4.35, 95% CI 1.72 to 11.04), BNP (33.9%, OR 7.37, 95% CI 3.53 to 16.75) or both (55.6%, OR 18.75, 95% CI 9.32 to 37.71) as compared to patients with normal cardiac biomarkers (6.25%).[12]

Atallah et al in 2020 concluded that to control the mortality and morbidity rates in high risk COVID patients, triage of COVID -19 patients into high- and low-risk groups using high sensitivity troponin is necessary.[13]

Qin et al in 2020 found out that patients with elevated cardiac injury markers above the established cutoffs were associated with significantly increased risk of COVID-19 death.[14]

In Wang et al. Case report of 138 hospitalized patients with covid-19, 7.2% had some form of cardiac injury, and 16.7% had arrhythmia.[15]

In Huang C et al[16] cohort of 41 patients, 12.1% had acute cardiac injury while in a large cohort study of 416 subjects' cardiac injury occurred in 19.7% of patients during hospitalization[16] and patients with myocardial injury had a significantly higher in-hospital mortality rate (42 of 82 [51.2%]) compared with those without myocardial injury (15 of 335 [4.5%]).[16] In another cohort by Zhou et al in 191 patients with covid-19, 17.2% of patients had cardiac injury.[17]

A meta-analysis of six published studies from China, including 1527 patients with covid-19 (Li et al.[18]) reported 8% of the patients had some form of cardiac injury. In another study by Guo et al[19] of 187 patients hospitalized with laboratory-confirmed covid-19, 27.8% had myocardial injury as determined by elevated levels

of troponin t (TnT). The in-hospital mortality rate stood at 59.6% (31 of 52) in patients with elevated TnT levels as compared to 8.9% (12 of 135) in patients with normal TnT levels.

Patients with known cardiovascular disease without elevation of TnT levels had a relatively favorable outcome but still worrisome prognosis was observed by Guo et al.[20] Our study did not show such association.

A recent case report from United Kingdom about a 47-year-old Covid -19 female with no cardiovascular co-morbidity, complicated with myopericarditis causing pericardial fluid accumulation and life-threatening cardiac tamponade requiring pericardiocentesis.[21] Biomarkers could not detect the cardiac changes in the female.

If the patient is suspected to have acute MI or heart failure, clinicians are advised to measure markers such as troponin or natriuretic peptides. Use of echocardiography or coronary angiographyin these patients is required for confirmation.

CONCLUSION
Our study showed no significant association between troponin and BNP values with the severity of Covid-19 disease. BNP values were raised in only 1-2 patients requiring oxygen and ventilator support. Cardiovascular complications are a major threat in patients having moderate or severe COVID. Early diagnosis of heart failure and acute myocardial infarction using cardiac biomarkers -BNP and Troponinis plausible. We conclude that co-morbid cardiovascular diseases are harmful but there association with COVID is not supported in this study. The retrospective nature of the study and limited sample size precludes toarrive at a meaningful conclusion. Large sample size and multi centric trials are needed to provide more robust evidence on findings from this study.

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