

# Impact of COVID 19 on outcome of primary percutaneous coronary intervention in Nepal.

Arun Kadel<sup>1</sup>, Shova Karki<sup>1</sup>, Binay Kumar Rauniyar<sup>1</sup>, Sushant Kharel<sup>1</sup>, Keshab Raj Neupane<sup>1</sup>, Kiran Prasad Acharya<sup>2</sup>, Kunjang Sherpa<sup>1</sup>, Chandra Mani Adhikari<sup>1</sup>

<sup>1</sup> Department of Cardiology, Shahid Gangalal National Heart Centre, Bansbari, Kathmandu, Nepal.

<sup>2</sup> National Health Service, United Kingdom.

**Corresponding Author:** Arun Kadel

Department of Cardiology, Shahid Gangalal National Heart Centre, Bansbari, Kathmandu, Nepal.

**Email:** arun.kadel@yahoo.com

**ORCID ID NO:** 0000-0002-7782-9445

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## Abstract

**Background and Aims:** The COVID 19 pandemic have affected the patients with ST segment elevation myocardial infarction as the number of patients presenting with STEMI declined substantially and those who underwent primary PCI had poor outcome. Our aim was to analyze the in-hospital and 30-days mortality in STEMI undergoing Primary PCI during second wave of COVID 19.

**Methods:** A prospective cohort study was conducted at Shahid Gangalal National Heart Centre, Bansbari, Kathmandu. Convenience sampling of patients who underwent primary PCI were enrolled in this study and were followed up for 30 days. Numerical variables were described as Mean  $\pm$  Standard Deviation (SD) and categorical variables were described as frequency and percentage. p values were calculated and considered significant if  $< 0.05$ .

**Results:** During this study period of 2 months from 1st May 2021 to 30th June 2021, 97 patients with STEMI underwent primary PCI, including 12 (12.47%) COVID 19 positive cases. 30 days mortality was 15.4% including in-hospital mortality of 11.34%. Among COVID 19 positive cases, in-hospital mortality was 33.33% and 30-days mortality was 55.55% which was significantly higher than non COVID 19 patient who underwent primary PCI ( $P=0.003$ ).

**Conclusion:** Overall, mortality rate of primary PCI during COVID 19 second wave has been increased and mortality of COVID 19 positive patients who underwent primary PCI was significantly higher than non-COVID 19 patients who underwent primary PCI.

**Keywords:** STEMI, Primary PCI, COVID 19, Nepal.

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## Introduction

Due to several factors like fear of COVID 19 exposure, and lockdown, delayed hospital presentations of ST elevation myocardial infarction (STEMI) have become common during the COVID 19 pandemic.<sup>1,2</sup> Pharmacological reperfusion instead of mechanical coronary reperfusion was the treatment modality during the early phase of COVID 19 pandemic. However, later primary percutaneous coronary intervention (PCI) is regarded as the treatment of choice in acute STEMI during this era as well.<sup>3,4</sup> Studies have shown that mortality rate was higher during COVID era.<sup>5</sup> The aim of this study was to analyze the in-hospital and 30-days mortality in STEMI undergoing Primary PCI during second wave of COVID-19.

## Methods

A prospective cohort study was conducted at Shahid Gangalal National Heart Centre (SGNHC), Bansbari, Kathmandu for a

duration of 2 months from 1st May 2021 to 30th June 2021. Following IRC approval (Reference number SGNHC/IRC No. 36-2021), convenience sampling of patients who underwent primary PCI were enrolled in this study and were followed up via telephone/ during hospital visit for 30 days. Informed written consent were taken in either Nepali/English language whichever they felt comfortable assuring full confidentiality. Consent was obtained from the patient party for those patients who were unable to give consent. For each patient, data including clinical information on symptom onset, medical history including history of Hypertension (HTN), Diabetes Mellitus (DM), Dyslipidemia, prior medication, angiographic findings, in hospital mortality, 30-day mortality were collected. Qualitative variables like gender, DM, HTN, Dyslipidemia, in hospital mortality were computed for frequency and percentage. p values of  $\leq 0.05$  was considered statistically significant.

## Results

During the study period, 97 STEMIs were treated with primary PCI among them 12 (12.4%) were COVID 19 positive and 85 (87.6%) were COVID 19 negative. Among COVID 19 positive patients 58.3% were male and 41.7% were female while among non-COVID 19 patients 75.3% were male and 24.7% were female. Hypertension and smoking were the most common risk factors in both COVID 19 and non-COVID 19 groups. Majority of the cases were referred from non-PCI capable center. Left ventricular ejection fraction was similar in both groups. Mean door to balloon time was  $64.4 \pm 11.5$  minutes in COVID 19 group while  $53.9 \pm 12.3$  minutes in non-COVID 19 group shown in table 1. Single Vessel disease (SVD) was the most common coronary angiography findings in both groups where Left anterior descending artery (LAD) was the most common culprit followed by Right coronary artery (RCA) in both groups. In-hospital mortality was 33.33% and 30 days mortality was 55.55% in COVID 19 group. In non-COVID 19 group, 30 days mortality was 15.4% including in-hospital mortality of 11.34% shown in table 2.

**Table 1.** Demographic variables and baseline characteristics, Door to balloon time and Coronary angiographic findings

	COVID (n=12)	Non-COVID (n=85)	p value
Age(years)	64.8 ± 11.5	54.9 ± 12.3	0.015
Sex			0.214
Male	7 (58.3%)	64 (75.3%)	
Female	5 (41.7%)	21 (24.7%)	
Risk factors			
Smoking	5 (41.7%)	44 (51.8%)	0.512
HTN	6 (50.0%)	39 (45.9%)	0.788
DM	5 (41.7%)	27 (31.8%)	0.494
Dyslipidemia	0 (0.0%)	7 (8.2%)	0.303
Family history of CAD	0 (0.0%)	1 (1.2%)	0.703
Referred from another center	9 (75%)	66 (77.6%)	0.411
Direct admission	3 (25%)	19 (22.4%)	0.443
LVEF during presentation (%)	40.0 ± 4.5	41.0 ± 5.7	0.497
DTB time (mins)	64.4 ± 11.6	53.9 ± 22.2	0.018
CAG finding			
SVD	5 (41.7%)	41 (48.3%)	0.666
DVD	1 (8.3%)	21 (24.7%)	0.204
TVD	6 (50.0%)	20 (23.5%)	0.664
Non critical CAD	0 (0.0%)	3 (3.5%)	0.509
Culprit artery			
LAD	7 (58.3%)	49 (57.7%)	0.609
LCX	0 (0.0%)	12 (14.1%)	0.164
RCA	5 (41.7%)	24 (28.2%)	0.342

**Table 2.** Mortality comparison among COVID and Non- COVID patients

Mortality	COVID	Non-COVID	p value
In-hospital	3 (25.0%)	7 (8.2%)	0.036
30 days	5 (41.7%)	10(11.8%)	0.003

## Discussion

Probably this is the first study done in Nepal to have evaluated the influence of COVID 19 on early outcomes in patients with STEMI. Following the COVID 19 pandemic, hospital all around the world observed a significant reduction in STEMI cases and primary PCI but there was no decline in number of primary PCI procedure in our setting. Rather there was increase in number of primary PCI cases. 7 Studies from all around the world suggested that patient who underwent primary PCI in COVID era had a significant increase in in-hospital mortality.<sup>6-8</sup> One study conducted in Italy during the first wave of the COVID 19 pandemic showed increased in 30 days mortality and around 5-fold increase in 30-day mortality in COVID 19 patients. Consistent with other international data, mortality of COVID 19 positive patients who underwent primary PCI was significantly high in comparison with non-COVID patients.<sup>9</sup> Comparing study data with 2019 SGNHC STEMI registry of 1 year overall, in hospital mortality was 10.3% during this study period while 6% in 2019. During the study period 48.5 vs 36.4 primary PCI per month, 33.2% increased as compared to non-COVID 19 eras.<sup>10</sup>

Our study showed that in overall cases around 2.5-fold increase in 30 days mortality while patients with COVID 19 positive showed a whopping around 7-fold increase in 30 days mortality.

## Limitation

This is a single center, prospective study with a small sample size. Though our study lacks the data regarding cause of death but our assumption regarding the higher mortality rate could be due to delayed treatment with primary PCI leading to increase in total ischemia time as well as higher multi-vessel thrombus burden as different studies have suggested.<sup>11</sup>

## Conclusion

Following the COVID 19 pandemic, unlike in other countries, we observed no decline in primary PCI procedures during study period. STEMI in COVID 19 patients is not the same disease process compared with STEMI without COVID 19. Mortality rate was increased as compared with non-COVID 19 eras.

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