Original Article

A Study to Evaluate Time Delays and Management Strategy in Patients Presenting with Acute Coronary Syndrome (ACS) in Only Armed Forces Tertiary Cardiac Care Centre in Eastern India during COVID-19 Pandemic

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Background : A study to evaluate time delays and management strategy in patients presenting with acute coronary syndrome in a Tertiary Cardiac Care Centre in Eastern India during COVID-19 pandemic.

Material and Methods : This is a retrospective, observational study that included all patients, 18 to 90 years of age, who had a history of recent ACS and presented to our hospital and who were diagnosed with an Acute Coronary Syndrome. A group of ACS patients from a similar time period of last year (1 January, to 31 August, 2019; pre-COVID-19 era group) was used as control. The main outcome was a delay in reaching the intervention cardiology centre and time to coronary angiography from the admission to Tertiary Cardiac Care Centre.

Results : A total of 54 subjects were studied in the study. They were divided into two groups. In group 1, 34 subjects were studied in COVID-19 pandemic time during the initial unlock period in India from 01 January, 2020 to 31 August, 2020. In group 2, 25 subjects from the pre-COVID-19 period during a similar time in 2019 were studied for comparison. The average age of the subjects in Group 1 was 50.4 years and 58 years in Group 2. The average time taken to reach this tertiary care centre was 11.76 days (range 0-30 days) in Group 1 and 3.2 days (range 0-11) days in Group 2. The average time to CAG from the time of admission was 3.4 days (range 1-6 days) in Group 1 when we exclude the subject who was found to be suffering from COVID-19 infection. The average time to CAG from the day of hospital admission was 1.6 days in Group 2. All the patients in both groups were discharged to home.

Conclusion : In the study, we have found a substantial delay in symptom onset to reaching our centre during the COVID-19 era.

We are in the middle of an unprecedented global pandemic. CORONAVIRUS 2019 (COVID-19), caused by severe acute respiratory syndrome CORONAVIRUS 2 (SARS-CoV-2 virus) has caused overlap in initial presentation with Acute Coronary Syndrome (ACS)[1]. Furthermore, symptoms alone are unhelpful, as quite a few screened for COVID-19 test negative and majority of COVID-19 infections are asymptomatic. There are multiple studies in the past which has shown that minimizing delays in reperfusion in patients with ACS is associated with improved outcomes[2]. Timely primary percutaneus coronary intervention relies heavily on systems of care, and not just the primary operator. There are multiple steps which are time consuming as in the emergency room. Every patient is required to establish contact history, symptomatology, chest X-ray, etc, before transfer to the Cardiac Catheterization Laboratory (CCL). CCL

> **Editor's Comment :**
> - The COVID-19 pandemic added substantially to already existing delays in patients with Acute Coronary Syndrome presenting to medical facilities. There was also a delay in coronary angiography after admission to the hospital because of various reasons like infrastructure, investigations and shortage of doctors and support staff during the ongoing pandemic.
> - During a pandemic, the public needs to be sensitized and timely reporting of emergencies other than pandemic-related should be emphasized.
> - The infrastructure of the hospital should be built and modified in a way so that the treatment of diseases other than the pandemic continues unhindered without any time delay and resource shortage.

staff require time to don personal protective equipment and there may be delay due to this[3].

Even before the delay in hospital, due to COVID-19 pandemic fear, patients are reluctant to report to medical care facilities, thus delaying the treatment[4]. Also, due to unavailability of transport, there has been substantial delays in reporting to hospitals.

During a public health emergency, these delays become even more challenging to predict, and there

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is hardly any literature which provides information about the impact of these emergencies on pre- and in-hospital logistics of ACS care, in particular patient-related delay.

Current study evaluates the time delay, management strategy and initial outcome while comparing with pre-COVID-19 pandemic times in patients presenting with ACS in the Tertiary Cardiac Care Centre in eastern India.

AIMS AND OBJECTIVES

Aim : To evaluate time delays and management strategy in patients presenting with ACS in the tertiary cardiac care centre in eastern India during COVID-19 pandemic.

Objectives :

(1) Time delay between onset of symptoms and admission to this hospital.

(2) Time delay between reporting to hospital to invasive cardiac intervention.

MATERIALS AND METHODS

Methodology :

Inclusion Criteria : All patients presenting to hospital and admitted as ACS.

Exclusion Criteria : Patients with Chronic Kidney Disease stage 2 and above.

No consent was taken as this study is a retrospective observational study.

Study Design :

This is a retrospective, observational study that included all patients, 18 to 90 years of age, who had history of recent ACS and presented to our hospital and who were diagnosed as ACS. ACS was defined according to the fourth universal definition of myocardial infarction Indications for primary PCI followed the current practice guidelines[2].

A group of ACS patients from a similar time period of last year (1st January to 31st August, 2019; pre-COVID-19 era group) were used as control.

Study Outcome :

The main outcome was delay in reaching intervention cardiology centre and time to coronary angiography from the admission to Tertiary Cardiac Care Centre.

RESULTS

A total of 54 subjects were studied in the study. They were divided into two groups. In Group 1, 34 subjects were studied in COVID-19 pandemic time during initial unlock period in India from 1st Junuary, 2020 to 31st August, 2020. In Group 2, 25 subjects

from pre-COVID-19 period during similar time in 2019 were studied for comparison.

Average age of the subjects in Group 1 was 50.4 years and 58 years in Group 2.

Distribution of type of ACS is given in Table 1.

Average time taken to reach this Tertiary Cardiac Care Centre was 11.76 days (range 0-30 days) in Group 1 and 3.2 days (range 0-11) days in Group 2. There was only one subject who was found to be COVID-19 positive and he was taken up for CAG for risk assessment after treatment of COVID-19 infection.

Average time to CAG from time of admission was 3.4 days (range 1-6 days) in Group 1, when we exclude the subject who was found to be suffering from COVID-19 infection.

Average time to CAG from day of hospital admission was 1.6 days in Group 2 (Table 2).

All the patients in both groups were discharged to home.

DISCUSSION

The current study highlights the impact of COVID-19 pandemic on patient presenting with ACS in regard to delay in presenting to intervention cardiology centre and time delay to invasive angiography.

The total ischemic time is a major determinant of outcomes in ACS patients, and early management is critical in reducing morbidity and mortality[2].

There has been several steps taken at the organizational level to reduce door-to-balloon time. However, outcomes to reduce patient-related delay has been controversial.

In our study, we have found substantial delay in symptom onset to reaching to our centre during the COVID-19 era. There has been substantial delay in coronary angiography even after admission to our

Table 1 — Types of Acute Coronary Syndrome in two Groups					
Type of ACS	Anterior wall MI	Lateral wall MI	Inferior wall MI	NSTEMI	Unstable Angina
Number of subjects :					
Group 1	16	6	6	6	6
Group 2	12	2	6	3	2

Table 2 — Average Delay in reporting to Hospital and Angiography		
	Group 1	Group 2
Average age in years	50.4	58
Days to reach invasive cardiology centre in days	11.76	3.2
Days to CAG from admission time in days	3.4	1.6

centre. The significant patient-related delay is likely due to the ongoing COVID-19 pandemic fear, fear of catching COVID-19 infection in hospital and non availability of transport from villages and smaller towns. Delay in seeking medical care due to fear of contracting infection was seen in the Ebola epidemic in West Africa (2013)[3]. In literature, various other causes for patient-related delay in STEMI have been described[4].

However, considering that these causes remained largely unchanged between 2019 and 2020[5], the COVID-19 pandemic has come out as the major new variable causing this substantial difference in patient-related delay[6-8].

In our study, we also have found substantial delay in CAG even after admission to hospital because of various reasons like time taken for RT PCR COVID test as all patients were subjected to CAG only after negative COVID-19 report due to availibilty of only one Cath Lab. Other causes of delay were staff shortage due to utilization in COVID duties, non-availibilty of sufficient beds in makeshift CCU, delay in getting routine blood reports prior to CAG etc.

Limitations :

The current study has limitations. First, this is a single center observational experience and may not be generalized to other centres. Second, patients were not followed up after hospitalization. Third, the onset of symptom subjective and precise timing may be controversial. Finally, sample size in our study is small and our study is retrospective, hence further analysis to identify independent predictors for delay are difficult to define. It would be better defined with a larger population survey.

Conclusion :

During the current the COVID-19 outbreak, there is need to sensitize public and the message "Stay at Home" should not be misinterpreted in a way that people ignore sinister symptoms of major events. They should be sensitized to seek medical advice in a timely manner.

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