

Effect of COVID 19 pandemic lockdown on acute coronary syndrome

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Abstract

Background: The present study evaluates the impact of lockdown during the COVID-19 pandemic on admissions for acute coronary syndrome (ACS) presenting to emergency department of a tertiary care center in Pune, Maharashtra. **Methods:** Records of patients with ACS from the months of March, April and May of 2019 were analyzed and compared to the corresponding months in 2020. The data from December 2019, January and February 2020 were also compared. A total number of 552 cases were included in this study. **Results:** We observed 187 ACS cases in the corresponding months of last year (pre pandemic interval) but 33 during the months of March, April and May 2020 (pandemic interval) and 61 in the months of December 2019, January and February 2020 (Chi square value – 17.33, p<0.001) suggesting reduction in ACS cases during the lockdown period. **Conclusion:** We observed a significant decrease in ACS hospitalizations during the lockdown interval which provides evidence for the influence of social and behavioral factors on coronary heart conditions. It is essential to understand the reasons for reduction in ACS cases during the lockdown period in comparison to the pre pandemic period to be prepared for the footfall of cardiac cases that may turn up in the coming months.

Key words: Acute Coronary Syndrome, Covid-19, Pandemic

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INTRODUCTION

The ‘Coronavirus disease 2019’ (Covid-19) has become a major cause of mortality worldwide. World Health Organization, on March 11, characterized COVID-19 as a pandemic.¹ A novel coronavirus, capable of human-to-human transmission, emerged in China at the end of 2019 and was named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).^{2,3} The resulting infection, called ‘COVID-19’ has a wide spectrum of severity, from

asymptomatic or pauci-symptomatic patients to patients with severe pneumonia and acute respiratory distress syndrome (ARDS) requiring mechanical ventilation. Recent evidence on COVID-19 suggests that the presence of comorbidities increase mortality risk in COVID-19 patients.⁴ During the COVID-19 pandemic, widespread use of social distancing measures or isolation has been adopted to minimize the spread of infection. Actions taken by various countries to prevent the spread of COVID 19 are similar to the earlier pandemic. This included even a complete lockdown policy over various parts of the world and was implemented in different phases. Lockdowns is a form of enforced social distancing which was implemented to reduce the transmission of SARS- CoV-2 in several countries. On 24 March 2020, the Government of India also ordered a lockdown for 21 days, limiting movement of the entire population of India as a preventive measure against the COVID-19 pandemic and this was extended in phases. This has helped in slowing down the growth of COVID in India but it negatively affected management of other conditions, especially acute cardiovascular

conditions. Lock-down has an effect on the management of Acute Coronary Syndrome (ACS), particularly ST-elevation myocardial infarction, and high-risk non ST-elevation myocardial infarction where time is the main determinant of the outcome.⁵ It has also been observed that COVID-19 infection is more likely to have poor prognosis and increased mortality in patients with advancing age, comorbidities like obesity, chronic obstructive pulmonary disease, diabetes mellitus, hypertension, coronary artery and cerebrovascular diseases. Cardiovascular diseases (CVDs) have now become the leading cause of mortality in India.⁶ There are fears that due to this pandemic, in the near future there could be a surge of patients with delayed complications of ST-Elevation Myocardial Infarction (STEMI), reinfarctions, heart failures and arrhythmias.⁷ Hence, knowing the trend of hospital admissions of ACS which will help healthcare professionals be better prepared for the future multisystem complications as well. A significant reduction in hospitalizations for ACS during the COVID-19 pandemic have been reported in several countries. In view of this, we need to identify how COVID-19 affected the care of patients with acute cardiovascular conditions. It is also essential to understand the reasons for the reduction in ACS cases during the lockdown period in comparison to the pre pandemic period so as to be prepared for the footfall of cardiac cases that may turn up in the coming months. The present study aims to examine the complications and outcomes in ACS hospitalizations before and after the onset of the COVID-19 pandemic in Pune, Maharashtra.

MATERIAL AND METHODS

This is a Retrospective descriptive study carried out in a Emergency medicine deptment of the Bharati Vidyapeeth Hospital, Pune, Maharashtra. A total of 552 subjects were included in this study. Inclusion criteria includes patients of acute coronary syndrome (ACS) having age more than 18 years. All patients admitted for ACS [including ST-elevation myocardial infarction (STEMI), non-ST-elevation myocardial infarction (NSTEMI)] were included in this study. Exclusion criteria includes those patients with Troponin I negative, dead cases and those not compliant to the further treatment/leave against medical advice. Records of patients with ACS from the months of March, April and May of 2019 were analyzed and compared to the corresponding months in 2020. The data from December 2019, January and February 2020 were also compared. The number of cases of ACS seen were contrasted and compared. For ascertaining the cases, we have employed the ACS/MI CODE system wherein the cases with symptoms are documented in a form called the ACS AUDIT FORM. Through this, the timing of arrival of patient, time of ECG taken and time taken up for

intervention was noted. The results were compared with the use of measures of central tendency and then evaluated COVID-19 pandemic and the reduction in ST-elevation myocardial infarction admissions.

RESULTS

Comparison of the number of ACS cases

Table 1 shows the comparison of the number of ACS cases during pre-pandemic and pandemic period. During the pandemic phase, 33 ACS cases were observed. In comparison, there were 61 in the 3 months prior and 187 during the months of March, April and May 2019 (chi square value – 17.33, p<0.001).

Table 1: ACS cases number

Acute Coronary Syndrome (ACS)					
	Yes	No	Total	Chi Square	p value
Last year	187	134	321	17.33	<0.001
Pandemic	33	56	89		
Pre Pandemic	61	81	142		
Total	281	271	552		

Table 2: Case comparison by gender and chest pain as a symptom

	Gender			Chi Square	p value
	Male	Female	Total		
Last year	233	88	321	5.75	0.056
Pandemic	58	31	89		
Pre Pandemic	88	54	142		
Total	379	173	552		
Chest pain					
	Yes	No	Total	Chi Square	p value
Last year	317	4	321	86.8	<0.001
Pandemic	72	17	89		
Pre Pandemic	99	43	142		
Total	488	64	552		

Comparison of ACS cases by gender and chest pain as a symptom

Table 2 shows comparison of ACS cases by gender. We observed that for chest pain as a symptom, the numbers were more for the pre pandemic and that of last year (317 last year, 72 in the pandemic and 99 in the pre-pandemic period – chi square= 86.8, p<0.001). There were more males than females during all the 3 phases of study (M:F= 233:88 last year, 58:31 during the pandemic time and 88:54 during the pre-pandemic area).

DISCUSSION

In the present study, we compared the recorded rates of ACS admissions during the Covid-19 lockdown interval with those during the same interval in the pre-Covid-19 interval of previous years. In our study population, we observed a reduction in the total number of ACS cases in the pandemic time. Our study shows similar results to the

study done by Wood S *et al.* which showed 70 % drop in MI admissions [8]. There are several potential reasons for this observation in our population. One possible explanation is that patients are too anxious to visit the hospital for fear of contracting the COVID-19 infection. It is also being speculated that patients with less symptoms or stable coronary artery disease (CAD) are being overlooked at the already overwhelmed hospitals that are now preferentially triaging the COVID-19 patients.⁹ Other reasons for a sudden reduction in STEMI admission could be less exposure of the individuals to stresses like pollution, which is now substantially reduced due to lockdown imposed, no annoyance of daily commute in traffic to the workplace, less physical strain, more family time and relaxation.⁹ It is also due to referring patients of ACS/STEMI for cardiac catheterization, with fibrinolysis being acceptable for many stable STEMI patients and conservative management being preferred for NSTEMI patients. "Staying at home" strategy may have led to an reduction in acute coronary events due to healthier lifestyle, better compliance and reduced stress¹⁰ Many possible theories are being flouted for this sudden reduction in ST Elevation Myocardial Infarction (STEMI) presentations. It is being speculated that patients with less symptoms or stable coronary artery disease (CAD) are being overlooked. These stable patients will possibly end up later in aggravated underlying CAD or delayed complications of STEMI. Other reasons are less exposure of the individuals to stresses like pollution, no annoyance of daily commute in traffic, less physical strain, more relaxation. Probably there is less smoking and alcohol consumption with better medication adherence leading to adequate control of hypertension and diabetes mellitus.¹¹ The reasons for the decrease in ACS admissions need to be vociferously looked into to ensure that hospitals are prepared in earnest for the landslide of cases that present with complications related to ACs like those of acute heart failure, arrhythmias, reinfarctions etc. The apparent decrease in rates of Acute Myocardial Infarctions (AMI) admissions in hospitals during the COVID-19 pandemic lockdown period could be due to true decrease in ACS rates or could be due to the unavailability of transportation access and fear of COVID-19 in hospitals. Activity modification with reduced physical activity and exercise during social isolation may have contributed to lower short-term rates of MI. A significant decrease in air pollution and less job stress were implicated for the decrease in ACS admissions.⁹ Indian CREATE registry has shown that most of the ACS patients reach the hospital by public or private transport. With the extended phases of lockdown, most of the public transport has ceased and private vehicles were off the road for varying periods

across different states of India. This can have a significant impact on ACS admission rates.¹²

A limitation of our study was that we did not try to look into cause of death in brought dead patients during the respective phases. A retrospective analysis of acute coronary syndrome (ACS) admissions in 15 Italian hospitals during the early days of COVID-19 pandemic, a decrease in ACS admissions but also an increase in death rate unrelated to COVID-19 infection. This has led to doubts that few patients with ACS died without seeking medical attention.¹³

CONCLUSION

The present study reports a significant decline in ACS hospitalizations in lockdown interval imposed due to COVID 19 pandemic. This has implications for the social and behavioral factors on coronary event rates.

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