

Admissions of Acute Coronary Syndrome among Patients during Early Phase and After One Year of Coronavirus Disease 2019 (COVID-19) Pandemic in Gaza

Ghada Naser and Mohammed Habib*

Department of Cardiology, Hospital of Alshifa, Gaza, Palestine

*Corresponding author: Mohammed Habib, Department of Cardiology, Hospital of Alshifa, Gaza, Palestine, Tel: +00972599514060; E-mail: cardiomohammad@yahoo.com

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Abstract

Background: What is the nature and duration of changes to admissions for different types of acute coronary syndrome (ACS), among patients during early stage and after one year of coronavirus disease 2019 (COVID-19) pandemic in Gaza?

Methods: The investigators analyzed data on hospital admissions in Gaza for types of Acute Coronary Syndrome (ACS) from August 25-2019, to October 1 2021, that were recorded in the Alshifa Hospital Cardiology Department Service Admitted Patient Care database. Admissions were classified as ST-Elevation Myocardial Infarction (STEMI) and non- ST elevation Acute Coronary Syndrome (ACS) (non-STEACS) and we calculate the diagnostic and Percutaneous Coronary Intervention (PCI) rate and we compared to the same time period in 2020 and 2021.

Results: Hospital admissions for Acute Coronary Syndrome (ACS) in 2019 was 99 patients declined to 40 patient's admission in 2020 and increased to 175 patients in 2021 in this time period. In 2020 a reduction of total Acute Coronary Syndrome (ACS) admission was 60%. During the period of declining admissions, there were reductions in the number of admissions for all types of Acute Coronary Syndrome (ACS), including both ST-Elevation Myocardial Infarction (STEMI) and NON-STEACS, with a percent reduction of 64 % NON-STEACS in parallel, reductions were recorded in the ST-Elevation Myocardial Infarction (STEMI) percent reduction by 46%, the mortality rate for ST-Elevation Myocardial Infarction (STEMI) patient was 4% in 2019 and 21% in 2020. The total Acute Coronary Syndrome (ACS) admission in 2021 was 175 patients, increases compared with 2019 by 77%. The increase rate in non-STEMI patient was 68 and increases rate in ST-Elevation Myocardial Infarction (STEMI) was 100% compared with 2019. The mortality rate for ST-Elevation Myocardial Infarction (STEMI) patient was 4% in 2019 and 2021.

Conclusion: We found that significant reduction in the number of patients with Acute Coronary Syndrome (ACS) who were admitted to the hospital but increase in mortality rate in ST-Elevation Myocardial Infarction (STEMI) in 2020 (during the first month of pandemic), and significant increases of Acute Coronary Syndrome (ACS) admission rate with the same mortality rate of ST-Elevation Myocardial

Infarction (STEMI) patients in 2021 (one year after pandemic) compared with 2019 in Gaza.

Keywords:

ACS admission; Coronavirus; Myocardial

Introduction

During coronavirus (COVID-19) pandemic, strict social containment measures have been adopted worldwide, and health care systems have been reorganized to cope with the enormous increase in the numbers of acutely ill patients [1-3]. During this same period, some changes in the pattern of hospital admissions for other conditions have been noted. The aim of the present analysis is to investigate the rate of hospital admissions and mortality rate for Acute Coronary Syndrome (ACS) in early stage (first 35 days) of pandemic in 2020 and one year after pandemic in 2021 compared to the same time period (from 25-28 to 1-10) in years of 2019.

Methods

Study design

In this study, we performed a retrospective analysis of clinical pattern of consecutive patients who were admitted for Acute Coronary Syndrome (ACS) at Al-shifa Hospital - Gaza. The study period was defined as the time between the first confirmed case of COVID-19 in Gaza 25-8-2020 and October 1, 2020. We compared hospitalization rate of Acute Coronary Syndrome (ACS) and mortality rates of ST-Elevation Myocardial Infarction (STEMI) patients between the study period and the previous year (August 25,2019 to October 1, 2019). And after one year after COVID-19 outbreak in Gaza at (August 25, 2021 to October 1, 2021).

All patient admitted with acute coronary syndrome and symptoms of upper tract respiratory infection or suspicion COVID-19 infection COVID-19 PCR test was mandatory.

Results

Different between (August 25 to October 1) in 2019 and 2020

Of the 139 patients who were hospitalized for Acute Coronary Syndrome (ACS) during the study period, 102 (73.4%) were males; the mean (\pm SD) age was 58 ± 11 years. Of these patients, 30 (21.6%) presented with ST-Segment Elevation Myocardial Infarction (STEMI). Hospital admissions for Acute Coronary Syndrome (ACS) declined from rate of 99 admissions in 2019 to 40 admission in 2020 in this time, a reduction of 60%. During the period of declining admissions, there were reductions in the number of admissions for all types of Acute Coronary Syndrome (ACS), including both Infarction (STEMI) and NON-STEACS, but relative and absolute reductions were larger for NSTEMI, (from 73 patients in 2019 to 26 patients in 2020) with a percent reduction of 64%. In parallel, reductions were recorded in the ST-Elevation Myocardial Infarction (STEMI) (from 26 patients in 2019 to 14 patients in 2020) percent reduction 46%, the mortality rate for ST-Elevation Myocardial Infarction (STEMI) patient was 4% in 2019 and 21% in 2020, for non-STEMI patient was 0% in 2019 and 4% in 2020. The diagnostic coronary angiography decrease from 130 to 31 cases (76%) and PCI decrease from 35 to 18 cases (49%) during this period.

We also have analyzed the outcome of Acute Coronary Syndrome (ACS) patients and compared this with previous year admissions. Even in those who attended the hospital, there was a delay in presentation. This delayed presentation was probably responsible for the low LVEF noted in these patients on admission, though rate of cardiogenic shock was increased. The increase in duration of hospital stay and the increase in cardiac medications on discharge could also be attributed to this lower LVEF on admission. Particularly, in ST-Elevation Myocardial Infarction (STEMI) patients, this delayed presentation also has reflected in the decrease in emergency coronary angiography latrophobia, which is not very uncommon, cannot be ruled out as a major contributing factor for the decline in admissions for Acute Coronary Syndrome (ACS). The fear of getting in contact with COVID-19 infected patients and the risk of infection keeps symptomatic patients from seeking acute medical care or delaying the visit to hospital.

Different between (August 25 to October 1) in 2019 and 2021

Of the 175 patients who were hospitalized for Acute Coronary Syndrome (ACS) during (August 25 to October 1) 2021, 136 (78%) were males; the mean (\pm SD) age was 59 ± 10 years. Of these patients, 52 (29.7%) presented with ST-segment elevation myocardial infarction (STEMI). Hospital admissions for ACS increased from rate of 99 admissions in 2019 to 175 admission in 2021 in this time, a increases rate of 77%. During the period of increases admissions, there were increases in the number of admissions for all types of ACS, including both ST-Elevation Myocardial Infarction (STEMI) and NON-STEACS, but relative and absolute increase were larger for ST-Elevation Myocardial Infarction (STEMI), (from 26 patients in 2019 to 52 patients in

2021) with a percent of 100%. In parallel, increases were recorded in the NON-STEMI (from 73 patients in 2019 to 123 patients in 2020) percent 68% (Table 1).

Table 1: Total acute coronary syndrome admission in Alshifa Hospital from August 25 to October 1 in 2019-2021.

	From August 25 to October 1			Difference between 2020 and 2021 compared with 2019	
	2019	2020	2021		
Total acute coronary syndrome admission	99	40	175	60%	77%
STEMI	26	14	52	46%	100%
Non STEACS	73	26	123	64%	68%

STEMI patient mortality was 4% in 2019 and in 2021. The diagnostic coronary angiography decrease from 130 to 31 cases (76%) and PCI decrease from 35 to 18 cases (49%) during this period.

In this time at 1/10/2021 the full vaccinated people 12% and partially vaccinated people 33% in Gaza. The patient with ST-Elevation Myocardial Infarction (STEMI) and history of vaccine in last 30 days was 8 patients. (6 patient after first dose of Pfizer vaccine, 1 patient of sputnik light vaccine, and one patient after full dose of Pfizer vaccine, the ST-Elevation Myocardial Infarction (STEMI) was developed after 2-9 days after vaccine) And the patients with ST-Elevation Myocardial Infarction (STEMI) and acute COVID-19 infection symptoms and PCR positive was 6 patients. 2 patients died with STEMI. the mortality rate for ST-Elevation Myocardial Infarction (STEMI) was ~ 4%, one of this was 52-year-old male patient with acute anterior ST-Elevation Myocardial Infarction (STEMI) after 7 days of the first dose of Pfizer vaccine due late admission to hospital, streptokinase was given then Pharmaco-Invasive (PCI) was done, sudden death after 14 hours of PCI was developed with electromechanically dissociation may be related to left ventricle wall rupture another death 86-year-old male patient with acute inferior ST-Elevation Myocardial Infarction (STEMI) during active infection of COVID-19.

Four patients who admitted to coronary care unit with initial diagnosis of non-STEACS after serial electrocardiography, echocardiography, coronary angiography and troponin level the final diagnosis were confirms acute myocarditis. All of this patients were history of Pfizer vaccine administration in previous one month. The age was (24-49) years, all patients were male.

Discussion

We found that significant reduction in the number of patients with Acute Coronary Syndrome (ACS) who were admitted to the hospital but increase in mortality rate in ST-Elevation Myocardial Infarction (STEMI) in 2020 during the first month of pandemic, the recent meta-analysis suggested that A total of 40 studies from different countries all over the world have shown a reduction in rates of admission in patients with Acute Coronary Syndrome (ACS) during the COVID-19 pandemic period compared with the same period in 2019 [4,5]. According to Palestinian Ministry of Health annual report 2020: The total mortality in 2020 was 5431 patients in Gaza. The mortality related to COVID -19 infection was 375 patients. The mean mortality between 2015 and 2019 was 260 per 100000, and in 2020 the mortality per 100000 was 261. The mortality related to cardiovascular disease was 162 per 100000 in 2019 and increased to 169 per 100000 in 2020. This data confirmed the increase of cardiovascular mortality in our trial 2020 in Gaza.

Globally, minimizing symptoms and fear of reaching out to hospitals expressed by delays in symptom to hospital times for fear of infection is probably the cause in many cases; driven by overwhelming messages from authorities and the media about COVID-19, especially that the reduction for Acute Coronary Syndrome (ACS) types with less severe clinical presentation/symptoms (ie, NSTEMI and UA) was more pronounced. Although an increase in out of hospital cardiac arrest, mortality [6,7]. Complications and more frequent left ventricle systolic impairment [8]. In 2021 significant increases of Acute Coronary Syndrome (ACS) admission rate with the same mortality rate of ST-Elevation Myocardial Infarction (STEMI) patients compared with 2019 in Gaza. Differently from previous reports, however, we observed a steep increase in Acute Coronary Syndrome (ACS) hospital admission rates following the very early phase of epidemic outbreak and national lockdown. Several hypothesis could be made regarding such increase in hospital admissions associated with:

1 A decreasing fear of potential SARS-CoV-2 infection through hospital admission and a growing awareness of the fatal risks inherent to a delayed Emergency Department admission [9].

2 A significant increase in the frequency of ST-Elevation Myocardial Infarction (STEMI) admissions was observed in Gaza during the Israeli attacks in 2021. The difference did not appear to be due to temporal variation. The Israeli military stated that during the hostilities with Palestinian armed groups in Gaza from May 10 to 21, its forces attacked about 1,500 targets with air- and ground-launched munitions. The United Nations reported that Israeli attacks killed 260 people in Gaza, at least 129 of them civilians, including 66 children. Local authorities in Gaza said that 2,400 housing units were made uninhabitable, while over 50,000 units were damaged, and over 2,000 industrial, trade, and service facilities were destroyed or partially damaged. In previous trial we found increased rate of myocardial infarction during the Israeli attacks at 2014 on incidence in Gaza [10].

3 Very bad economic situation in Gaza after Israeli attack in May 2021 may be playing important role of severe stress of many people in Gaza.

4 Recent trial suggested that the risk of myocardial infarction increased by a factor of one after vaccination, which translated to approximately one excess events per 100,000 persons, after BNT162b2 mRNA vaccine But this increased by 25 events per 100,000 persons after COVID -19 infection in Israel [11].

5 Another interesting analysis noted in our study Therefore, to avoid delay in reperfusion, so that we were given more Fibrinolytic Therapy (FT) in our emergency room. And decreased primary PCI related to non-a viability of coronary stents in Gaza may be increased the number of patient who admitted to Acute Coronary Syndrome (ACS) after myocardial infarction.

Conclusion

Our study from alshifa hospital cardiac center in Gaza showed that Acute Coronary Syndrome (ACS) admissions during COVID-19 pandemic has declined and even in those who presented to hospital, there was delay in presentation leading to outcome differences compared to previous year in early time period of COVID-19 pandemic in Gaza. But after one year we found a net increase in the incidence of Acute Coronary Syndrome (ACS) admissions.

Limitations

The limitations in this study were the small sample size, and short term 35 days registry for every year from 2019-2021.

Study Association

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Conflict of Interest

No potential conflict of interest relevant to this article was reported

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