

ST-T Segment Elevation Myocardial Infarction in a Center from Buenos Aires city During the COVID-19 Pandemic

Presentación del infarto agudo de miocardio con elevación del segmento ST-T en un centro de Ciudad de Buenos Aires durante la pandemia COVID-19

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ABSTRACT

The COVID-19 pandemic presents an exponential growth in the number of admissions in intensive care units due to the necessity for respiratory support in this patients and a diminish in the consultation for another severe illnesses that were prevalent in years before, such as acute coronary syndromes with ST-T elevation segment. In our institution this phenomena was present with a delayed symptoms-first medical contact, with later presentations and an elevation of complications during hospitalization, including cardiogenic shock and acute heart failure.

Keywords: STEMI, STEACS, COVID-19, SARS-CoV-2

RESUMEN

La pandemia COVID-19 presentó un aumento exponencial en el número de internaciones en las unidades de cuidados intensivos alrededor del mundo debido al requerimiento de asistencia ventilatoria y una disminución en la consulta de patologías graves y prevalentes en años previos, en especial de casos graves como el síndrome coronario agudo con elevación del segmento ST-T. En nuestra institución se manifestó el fenómeno con un aumento en los tiempos dolor-primer contacto médico, con presentaciones tardías, y un aumento de las complicaciones intrahospitalarias, incluyendo shock cardiogénico e insuficiencia cardíaca aguda.

Palabras claves: IAMCEST, SCACEST, COVID-19, SARS-CoV-2

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INTRODUCTION

The highly infectious coronavirus-2 (SARS-CoV-2) that has caused the current COVID-19 pandemic has also caused the collapse of public healthcare systems of numerous countries in Asia, Europe, and America due to the need for ventilatory support in complex patients with long intensive care unit (ICU) stays^{1,2}. At the same time, consultations due to other prevalent conditions have gone down significantly^{3,4}. However, at the start of May 2020 the COVID-19 related infection and mortality rates were lower in Argentina compared to the ones reported by other countries. Still, the consultations for conditions with a high morbimortality burden like the ST-segment elevation myocardial infarction (STEMI) have dropped compared to previous years. Similar results have been reported in other countries^{3,4}. The objective of this manuscript is to assess the immediate impact of this findings to anticipate behavioral patterns to alleviate the possible consequences.

MATERIAL AND RESULTS

Since the World Health Organization (WHO) declared the SARS-CoV-2 pandemic back in March 11, 2020, many countries decided to implement quarantines as a way to flatten the curve of contagion. Argentina declared a mandatory quarantine back in March 20, 2020 at 00:00 hours⁵. Since then, 7 patients with a diagnosis of STEMI have been admitted to our center and included consecutively in this registry. The baseline, clinical, and angiographic data of all consecutive patients were analyzed and compared to the data of patients admitted the year before with the same condition. The main characteristics of both groups are shown on table 1. In the COVID-19 group the mean age was 70.8 ± 10.4 years, 85.7% of the patients were males and they reported pain (first medical contact, 552 ± 300 minutes). All cases underwent a primary coronary intervention. The rate of angiographic success was 100% and 1.8 stents were implanted per patient. The rate of complications was 71.4%. One patient had cardiogenic shock, 2 more patients required IV diuretics with KK class B at admission, 1 of them had cardiac tamponade and the other bleeding at the puncture site. The mean stay in the coronary unit was 9 ± 10 days. When these results were compared to patients with ST-segment elevation from 2019 (Pre-COVID-19) significant differences were seen regarding the pain onset-to-first medical contact time ($P=.001$), but no differences were reported regarding the door-to-balloon time ($P=.76$). Cardiogenic shock, the ejection fraction measured on the color Doppler echocardiography, and the rate of bleeding that required longer hospital stays were higher in the COVID-19 group compared

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Los autores declaran no tener conflictos de intereses.

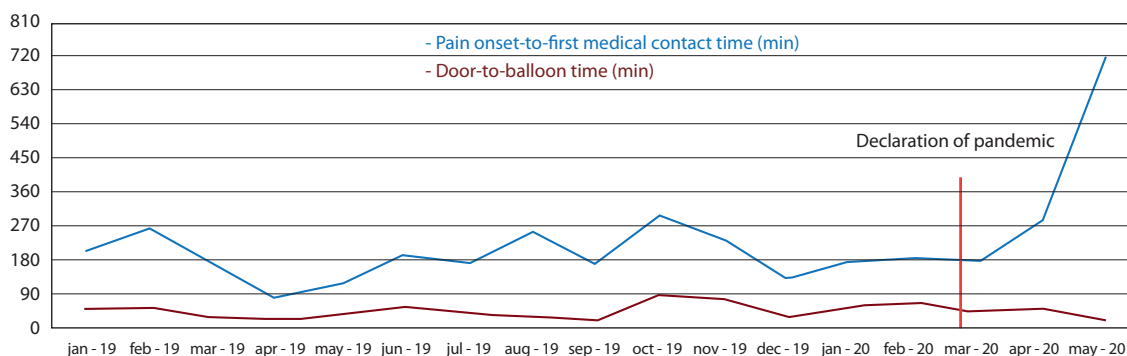


Figure 1. Differences regarding complications between patients before and after COVID19

TABLE 1. Baseline, clinical, and angiographic characteristics of patients with STEMI admitted to the coronary unit during the current COVID-19 pandemic.

N	Age	Sex	Pain onset-to-first medical contact time (min))	Door-to-balloon time (min)	Culprit vessel	Multiple vessels	Killip-Kimball	Cardiogenic shock	Post-PCI LVEF	Hospital stay (days)
1	57	Male	180	45	LAD	No	A	No	Mild	4
2	78	Female	120	60	LAD	Yes	B	No	Moderate	4
3	44	Male	360	90	LAD	Yes	A	No	Mild	5
4	55	Male	120	60	LAD	Yes	B	No	Moderate	5
5	63	Male	720	15	LAD	Yes	D	Yes	Severe	15
6	53	Male	840	30	LAD	Yes	A	No	Moderate	6
7	61	Male	600	15	LAD	Yes	A	No	Moderate	6

to patients previously admitted as shown on table 2. Figure 1 shows the pain onset-to-first medical contact time from January 2019 through May 2020. The start of the COVID-19 pandemic is shown with a red vertical line.

DISCUSSION

Yet despite its observational nature and unknown confounding factors, these findings are indicative that the impact the COVID-19 quarantine had had on our population has delayed consultation times especially in cases of ST-segment elevation myocardial infarction. This results in higher rates of complications and longer intervention times, which is especially detrimental to the patients' state of health, in particular, and the healthcare system in general since the occupation time of beds for high-complexity care is longer. These results are similar to those reported in other countries⁷. In a letter sent to the editor of Solomon et al. published in the *New England Journal of Medicine* back in May 19th, the authors reported fewer AMI related hospitalizations in a California hospital, United States compared to previous years; these results are similar to those reported in Northern Italy^{7,8}. In our own experience, the beginning of the pandemic was associated with fewer consultations, which gave rise to a second stage where patients started seeking medical attention a little too late. This is somehow consistent to what has been published recently⁷. This last stage is not over yet in our country. The consequences that these findings will have in the future are still

TABLE 2. Patients with STEMI admitted to our coronary unit before and after the current COVID-19 pandemic.

	2019 (Pre COVID-19)	2020 (COVID-19)
N	42	7
Age (Years)	63.5±13.8	50.6±10.5
Male sex	80.4%	85.7
Arterial hypertension	63.4%	85.7%
Dyslipidemia	31.7%	14.3%
Diabetes mellitus	29.3%	14.3%
Family history	9.8%	42.9%
Smokers	22%	14.3%
Previous coronary artery disease	17.1%	28.5%
Pain onset-to-first medical contact time (min)	193±37	552±300
Door-to-balloon time (min)	46±26	54±27
Percutaneous coronary intervention	98%	100%
UST peak levels (ng/L)	150000±26700	186000±8270
Post-revascularization LVEF	46.3±11.8%	40.2±8.5%
In-hospital mortality	4.7%	0.0%
Cardiogenic shock	4.7%	14.2%
Bleeding*	4.7%	14.2%

UST: ultrasensitive troponin. LVEF: left ventricular ejection fraction.

* Bleeding associated with longer hospital stays.

unknown. However, based on previous data, the mortality rate could go up. The patients' rate of heart failure and their quality of life could go down as well. We suggest active policies to raise the awareness of the population on these indirect complications due to the current COVID-19 pandemic.

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