

## ST-Elevation Myocardial Infarction in Patients with COVID-19: A Single's Centre Experience

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### Abstract

Cardiac injury in coronavirus disease 2019 (COVID-19) infection is not uncommon and the mechanism by which it occurs remains uncertain. Multiple mechanisms have been suggested for cardiac damage in patients infected with the virus and portends poorer prognosis. This document shows how the patients with COVID-19 pneumonia and cardiac injury often had epicardial coronary free of stenosis. We analyzed all cases of ST elevation myocardial infarction COVID-19 patients, in a single Italian Centre.

**Keywords:** ST-Elevation Myocardial Infarction; COVID-19

### Introduction

The Coronavirus disease 2019 (COVID-19) is an infectious disease caused by a newly discovered coronavirus named SARS-CoV2 [1]. The COVID-19 was discovered in Wuhan (China) and it has spread rapidly across the world causing a global pneumonia pandemic. Cardiovascular disease is the major comorbidity of COVID-19 patients and is closely related to severity of COVID-19. SARS-CoV2 infection can directly or indirectly cause cardiac complications, such as acute myocardial injury and myocarditis, heart failure and cardiac arrest, arrhythmia, acute myocardial infarction, cardiogenic shock or Takotsubo cardiomyopathy. Cardiac injury in COVID-19 infection is not uncommon and the mechanism by which it occurs remains uncertain. Multiple mechanisms have been suggested for cardiac damage in patients infected with the virus [2,3]. A recent review showed how SARS-CoV2 triggers viral infection related heart damage by multiple mechanisms, such as direct injury, downregulation of ACE2, immune injury, hypoxia injury and psychological injury [4]. Furthermore, a recent study, based on autopsy examination of 40 hearts from subjects dying of COVID-19 infection, showed that many cases had microthrombi in myocardial capillaries, arterioles, and small muscular arteries [5]. These results might explain that in approximately 40% of patients with COVID-19 and ST-Elevation Myocardial infarction (STEMI) a culprit lesion is not identifiable by coronary angiography [6]. It was observed that these patients have a worse prognosis because the cardiac injury is associated with higher risk of in-hospital mortality [7].

We analyzed the characteristics of the COVID-19 patients with STEMI who admitted to our catheterization laboratory for invasive coronary angiography (ICA) since the beginning of COVID-19 pandemic. In this monocenter retrospective analysis, we reviewed charts of patients admitted for symptomatic COVID-19 infection and ST elevation myocardial infarction (STEMI) at the San Giovanni di Dio Hospital, in Agrigento that is Sicily's town in South of Italy. It was important to consider that in Sicily the total cases of COVID-19 were ~8,55 Mln and 141.000 deaths until January 15, 2022.

## Methods

### Patients

This is a retrospective observational analysis that included all COVID-19 patients with STEMI who admitted to our catheterization laboratory of San Giovanni di Dio Hospital, in Agrigento (Italy) for invasive coronary angiography. We considered all cases of COVID-19 patients with STEMI since the beginning of pandemic, in detail from March 1-2020 to January 15-2022. Furthermore, we evaluated the following features: mean age, sex, previous percutaneous coronary intervention (PCI) or coronary artery bypass graft surgery (CABG), invasive coronary angiography (ICA), primary PCI (PPCI), COVID-19 pneumonia, orotracheal intubation (OTI) and deaths.

### Statistical analysis

Continuous variables were reported as mean +/- standard deviation while dichotomous covariates as frequencies and percentages. We evaluated the cumulative number of COVID-19 patients with diagnosis of STEMI during a specific period (from March 1-2020 to January 15-2022) and for each patient we considered specific features.

## Results and Discussion

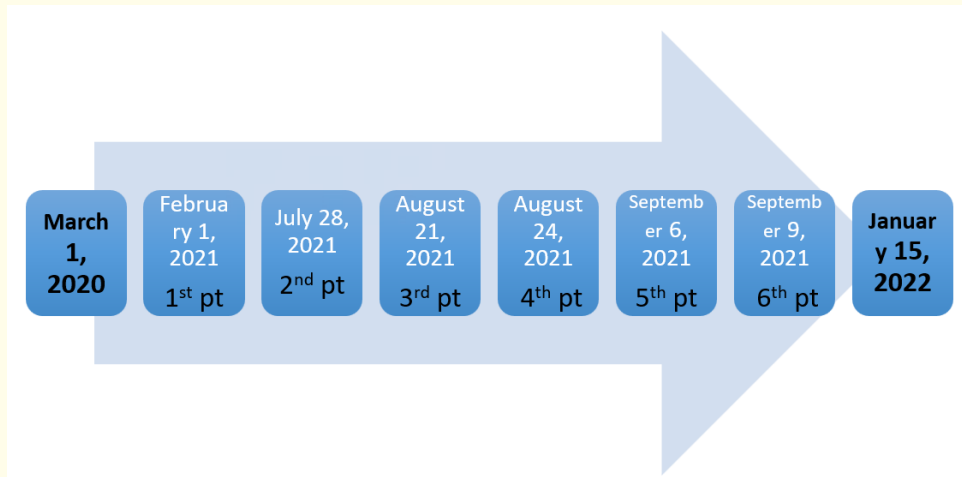
The characteristics are show in table 1. The patients who admitted to our Hospital were all males and affected by documented COVID-19 pneumonia, two of them were in OTI. Only two patients had previous PCI or CABG and all patients were underwent to ICA without complications.

Characteristics	Patients (N = 6)
Age (years) (mean ± SD)	64,5 ± 16
Male sex no./tot (%)	6/6 (100%)
Previous PCI/CABG no./tot (%)	2/6 (33%)
ICA no./tot (%)	6/6 (100%)
PPCI no./tot (%)	2/6 (33%)
COVID-19 pneumonia no./tot (%)	6/6 (100%)
OTI no./tot (%)	2/6 (33%)
Death no./tot (%)	5/6 (83%)

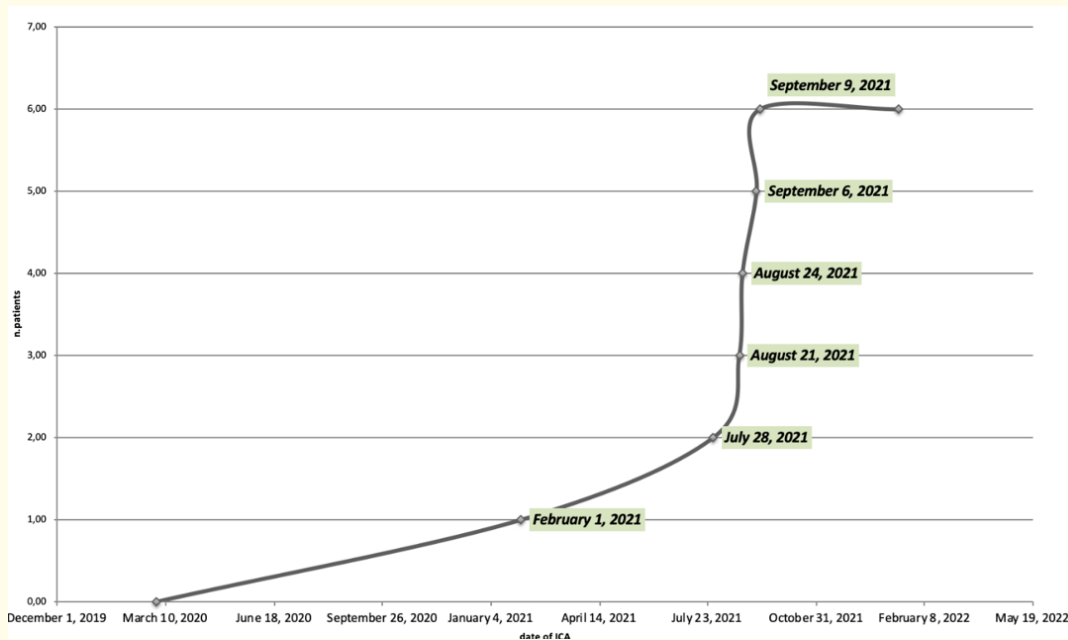
**Table 1:** Baseline characteristics of patients.

PCI: Percutaneous Coronary Intervention; CABG: Coronary Artery Bypass Graft; ICA: Invasive Coronary Angiography; PPCI: Primary Percutaneous Coronary Intervention; OTI: Orotracheal Intubation.

The cumulative number of patients who admitted to our Hospital for STEMI and concomitant COVID-19 pneumonia from March 1-2020 to January 15-2022 was six (Figure 1). Since the beginning of COVID-19 pandemic the first case was observed after almost a year, exactly on February 1-2021 (Figure 2). This result could advance two remarks considering a specific period (from March 1-2020 to February 01-2022): the COVID-19 pandemic was associated with significantly lower rate of hospital admissions for STEMI [8]; our Hospital is located in geographic area where the cases of SARS-CoV2 were few compared to other regions of Italy.



**Figure 1:** Shows that the cumulative number of STEMI patients and concomitant COVID-19 pneumonia from March 1-2020 to January 15-2022 is six. It shows the date of invasive coronary angiography for each patients.



**Figure 2:** Shows the total and cumulative numbers of STEMI and COVID-19 patients during specific pandemic period (1 March 2020 to 15 January 2022). It shows the first case on 1 February 2022 and many cases from July to September 2022.

Furthermore, many cases were observed during the 2021 summer season, a period during which the number of Covid-19 infections in Sicily increased (Figure 2).

In detail, all patients were underwent to ICA but the PPCI was performed only in two of them. This result suggested that in many cases a culprit lesion was not identifiable by coronary angiography. In two patient undergoing PPCI, the culprit lesions were the right coronary in one case and the circumflex coronary in the other. One of the two patients undergoing PPCI died. Moreover, considering all six patients, five died. The death did not occur during the ICA or PPCI but after a few days. This result could suggested that heart involvement is associated with a poor prognosis in COVID-19 disease.

The limits of our document were the following: a little simple size; monocenter analysis.

### Conclusion

In conclusion, ST-Elevation Myocardial Infarction in patients with COVID-19 often is associated with epicardial coronary arteries angiographically without a culprit lesion. This result could support the speculation that the cardiac injury is refer to coronary microvascular disease instead of epicardial coronary arteries disease. Furthermore, this observation could suggest the routine use of non-invasive diagnostic tests such coronary CT angiography (CTA) instead ICA in this setting. Finally, cardiac injury is related to higher risk of mortality.

The further future analysis could be useful to have more data on mechanism of cardiac injury in COVID-19 infection.

### Disclosures

None. The authors have reported that they have no relationship relevant to the contents of this paper to disclose.

### Bibliography

1. Chih-Cheng L., *et al.* "Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): the epidemic and the challenges". *International Journal of Antimicrobial Agents* 5.3 (2020): 105924.
2. Xiong TY., *et al.* "Coronaviruses and the cardiovascular system: acute and long-term implications". *European Heart Journal* 41.19 (2020): 1798-1800.
3. Schoenhagen P., *et al.* "Plaque vulnerability, plaque rupture, and acute coronary syndromes: multifocal manifestation of a systemic disease process". *Circulation* 106 (2002): 760-762.
4. Jinwen L., *et al.* "Cardiovascular disease in patients with COVID-19: evidence from cardiovascular pathology to treatment". *Acta Biochimica et Biophysica Sinica* 53.3 (2021): 273-282.
5. Pellegrini D., *et al.* "Microthrombi as a major cause of cardiac injury in COVID-19". *Circulation* 143.10 (2021): 1031-1042.
6. Stefanini G., *et al.* "ST-Elevation Myocardial Infarction in Patients with COVID-19". *Circulation* 141.25 (2020): 2113-2116.
7. Shi S., *et al.* "Association of cardiac injury with mortality in hospitalized Patients with COVID-19 in Wuhan, China". *The Journal of the American Medical Association Cardiology* 5 (2020): 802-810.

8. Di Liberto IA., *et al.* "Impact on hospital admission of ST-elevation myocardial infarction patients during coronavirus disease 2019 pandemic in an Italian Hospital". *Journal of Cardiovascular Medicine* 21.9 (2020): 722-724.

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