



Corona Virus Disease 19 (CoViD-19) impact on cardiovascular disease in a non-CoViD-19 emergency setting

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Dear Editor,

Emergency Departments (ED) are the front-line setting in fighting the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) pandemic. Italy was the first Western country to face a huge number of Coronavirus Disease (CoViD-19) patients, resulting in a major mortality increase as compared to the previous years [1]. In the attempt to curb the spread of SARS-CoV-2, the Italian Government declared a nationwide lockdown from March 11, 2020. Numerous restrictive measures were applied to avoid the collapse of the national health system, advertised as the “stay at home” campaign [2]. Patients were advised against going to Emergency Departments if not strictly necessary, also as a measure to contain the spread of the virus in hospitals. The Apulia Region, in Southern Italy, arranged for the conversion of 9

hospitals into CoViD-19 centers. These hospitals include 6 General hospitals with a general ED as well as a dedicated CoViD-ED, while the 3 remaining basic hospitals have only a CoViD-ED. The other 50 hospitals (including basic and general hospitals) were dedicated to non-CoViD (“clean”) patients, to care for most other emergencies. Ex officio medical consultations were suspended, and non-urgent cases were managed by telemedicine.

The data on the prevention of CoViD-19 contagions in ED have recently become available [3]. However, there are no data available on non-CoViD-19 diseases admitted to ED since March 2020.

To study the trend of access to ED during the SARS-CoV-2 pandemic, we compared the discharges between March 11 and April 10, 2020 to the same interval in 2019 and 2018 (Table 1). This was a collaborative regional multi-center study performed in three non-CoViD-19 ED, located in one general and two basic hospitals, which serve a care area of more than 380,000 residents. Patients of all ages are cared for at these hospitals, from birth to old age. During the study period, a median of 556 Covid-19 patients were hospitalized daily in Apulia.

We queried the Apulian regional patients database of the health care system Edotto[®] (Exprevia, Molfetta, Italy) to download ED data on patients discharges during the study period. No personal data were analyzed and only a comparison of admission/discharge data was made. Therefore, no informed consent or ethical approval was necessary.

Using ICD-9 discharge diagnosis codes, we focused our preliminary analysis on cardiovascular diseases: ischemic cardiac pain, presenting as myocardial infarction (ICD-9: 410) and ischemic angina (ICD-9: 411), stroke (ICD-9: 434, 435, 436), heart failure (ICD-9: 428), cardiac arrest (ICD-9: 427.5), hypertension (ICD-9: 401), cardiac arrhythmias (ICD-9: 426, 427 without 427.5), and pulmonary embolism (ICD-9: 415.19). We also analyzed data on non-cardiac chest pain and anxiety. All patients were discharged as

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Table 1 Comparison of disease diagnoses in the three years studied, expressed as absolute number, percentage (%) of discharges on ED total patients (in brackets) and as incidence per 100,000 patients examined

Diagnosis	2020 Lockdown		2019		<i>p</i>	2018		<i>p</i>
	<i>N</i> (%)	Incidence	<i>N</i> (%)	Incidence		<i>N</i> (%)	Incidence	
Population	382,973		384,590			385,175		
Total ED patients	2572	651.59	8071	2098.60	<0.0001	7572	1965.86	<0.0001
Myocardial ischemic disease	17 (0.66)	4.44	47 (0.58)	12.22	0.0003	35 (0.46)	9.09	0.019
Stroke	4 (0.16)	1.04	26 (0.32)	6.76	0.0001	25 (0.33)	6.49	0.0002
Heart failure	31 (1.21)	8.09	44 (0.55)	11.44	ns	36 (0.48)	9.35	ns
Cardiac arrest	12 (0.47)	3.13	3 (0.04)	0.78	0.038	3 (0.04)	0.78	0.038
Hypertension	55 (2.13)	14.36	133 (1.65)	34.58	<0.0001	148 (1.95)	38.42	<0.0001
Cardiac arrhythmias	36 (1.40)	9.40	81 (1.00)	21.06	<0.0001	104 (1.37)	27.00	<0.0001
Pulmonary embolism	2 (0.08)	0.52	5 (0.06)	1.30	ns	2 (0.03)	0.52	ns
Non-cardiac chest pain	57 (2.22)	14.88	379 (4.70)	98.54	<0.0001	375 (4.95)	97.36	<0.0001
Anxiety	39 (1.52)	10.18	88 (1.09)	22.88	<0.0001	85 (1.12)	22.07	<0.0001

non-CoViD-19, because RT-PCR tests for SARS-CoV-2 resulted negative in all nasopharyngeal swab samples tested at admittance.

We applied the Pearson χ^2 test, setting a *p* value <0.05 as statistically significant, using GraphPad Prism, Version 6.0 (GraphPad Software, San Diego, California).

We found that during the Spring lockdown the total number of ED visits for cardiovascular diseases was significantly lower than the data for the same period in the two previous years. Discharges in 2020 for ischemic disease, stroke, hypertension, and cardiac arrhythmias were significantly reduced, as also for non-cardiac chest pain and anxiety (Table 1). The data on ED visits for heart failure did not show statistically significant differences. On the contrary, we found a significant increase in the frequency of cardiac arrest in 2020 as compared to 2018 and 2019 (Table 1).

Apulia is one of the Italian regions with a low CoViD-19 incidence and its emergency system for outpatients responded relatively efficiently during this pandemic. Nevertheless, there was an increase in the all-cause mortality rate compared to previous years [1], partly due to SARS-CoV-2 infection.

Some speculations may be advanced on the basis of our data. Although not representative of the national situation, they could indicate that the lockdown determined an overall decrease in ED visits for non-CoViD-19 cardiovascular diseases. The smaller number of ED discharges for anxiety and non-cardiac chest pain is interesting. At the same time, as also in Italian regions with a high SARS-CoV-2 incidence rate [4], lockdown reduced access to healthcare facilities for acute ischemic heart diseases and stroke.

Some factors may have influenced our results, such as the reduction of urban life stressors, such as pollution, rush hour home-to-work journeys, overcommitment, etc. During lockdown, there was no rush hour traffic because smart-working

at home became more generalized. This reduction in stressors may also have co-influenced the decrease in diagnoses of anxiety and hypertension made at ED. Emotional stressors, in fact, are modifiable risk factors associated with increased blood pressure and cardiac ischemia [5]. Moreover, the reduction of discharges for hypertension might also explain the reduction for other cardiovascular diseases because hypertension is a notorious risk factor for acute ischemic disease, stroke, and cardiac arrhythmias [6].

Another co-factor is the fear of contagion [7], that reduced non-cardiac chest pain ED visits. The downside was that fearful patients deferred hospital access even in cases of severe clinical conditions, thus possibly causing or at least contributing to the significant increase of cardiac arrest cases.

Finally, reduced social connections resulted in delayed notification to emergency services, especially among elderly people, contributing to reduce the proportion of patients hospitalized for stroke and ischemic heart disease.

Indeed, no reduced discharge rate for heart failure may be explained by the fact that dyspnea is the leading symptom and one of the most important causes of access to the ED [8].

The SARS-CoV-2 pandemic has caused, albeit indirectly, an interruption or delay in the management of some chronic diseases including cardiovascular disorders, leading to an increase and exacerbation of these, as compared with the data for the recent years [9, 10]. However, other diseases, such as psychiatric distress or trauma, may be influenced by the same factors. These should be investigated in a specific evaluation. On the basis of these data, it is important that health policy makers should address the issue of appropriate strategies and measures for the management of chronic diseases in the event of a pandemic emergency.

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Compliance with ethical standards

Conflict of interest The author(s) declare that they have no conflict of interest.

Statements on human and animal rights This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent None.

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