Impact of the first coronavirus-disease pandemic wave on cardiovascular admissions and sudden cardiac death rates in Greece

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Funding Acknowledgement: Type of funding sources: None.

Background: Various studies suggest a decrease of hospital admissions for acute coronary syndromes (ACS) during COVID-19 outbreak, implying an increase in ACS related pre-hospital-care deaths as a cause of this phenomenon.

Purpose: Aim of this study was to investigate the impact of social containment measures on ACS admission and acute coronary deaths (ACDs) rates in Greece, during COVID-19 first pandemic wave in 2020.

Methods: Data for this analysis were retrieved by the official records of University Forensic and Cardiology Departments and the Forensic Science Services of the most crowded metropolitan areas of Greece (almost 25% of the entire Greek population ≈ 2.5 million people). The study period was defined as the time between March 15 2020, when the Greek state started to implement strict lock-down measures to contain COVID-19 pandemics, until April 14 2020. To compare admission and SCD rates, a corresponding control period a year earlier was chosen. Incidence rates (IRs) (events over days) of ACSs and ACDs in each time-period were assessed along with IRs ratios (IRRs) and 95% CI intervals. Secondary analysis for non-ischemic cardiovascular deaths (CVDs) or violent deaths (VDs) (including road traffic accident deaths) was also performed.

Results: There has been a relative 38.9% reduction in ACS admissions in 2020 [1.8, 95% CI (1.35–2.34) in 2019 vs 1.1, 95% CI (0.76–1.54) in 2020, p=0.02], concordant with a 66% relative reduction of total admissions (p<0.005). Overall, 171 deaths in 2020 vs 208 in 2019 were referred for autopsies in the enrolled forensic departments. Gender and age distribution were not significantly different between case and control periods. There were no statistically significant differences in the frequency of deaths between the two periods examined, with the exception of deaths secondary to road traffic accidents [IR 0.13, 95% CI (0.04–0.34) in 2020 vs 0.67, 95% CI (0.41–1.03) in 2019, p=0.001] and CVDs [IR 0.43, 95% CI (0.23–0.74) in 2020 vs 1.03, 95% CI (0.70–1.47) in 2019, p=0.007] which significantly decreased during COVID-19 pandemic wave. Absolute numbers, percentile changes and IRs are demonstrated in Figure 1 and Table 1.

Conclusions: Our analysis offers evidence over a significant decrease in ACS-related hospitalization rates during COVID-19 first pandemic wave. This decrease is not linked to an increase in pre-hospital, autopsy defined ACDs, as previously thought, implying that many ACS patients may not ask for help on time due to infection fear, being prone however to late-onset complications. Pre-hospital triage and care services, should be appropriately transformed to facilitate and speed-up access of cardiovascular patients to health-care systems during the pandemic.

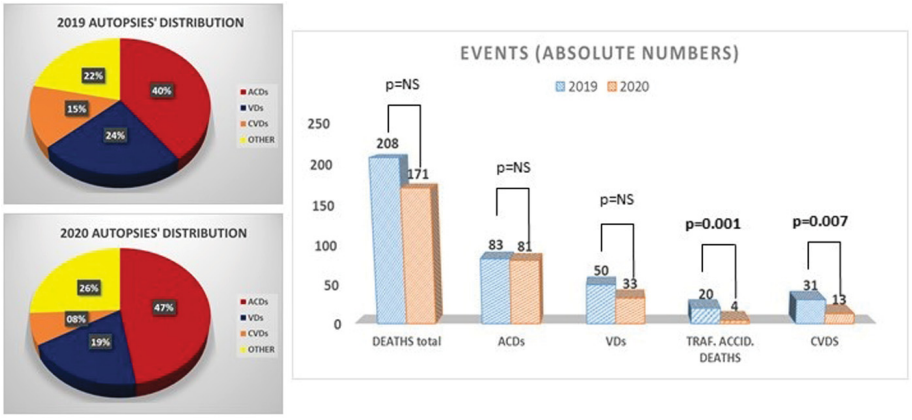

Figure 1

Table 1. Comparison of admission and sudden cardiac death rates in representative metropolitan areas of Greece between Covid-19 self-containment period in 2020 and control period in 2019.

	IR 2020 (95% CI)	IR 2019 (95%CI)	IRR (95% CI)	p value
Total Admissions	6.07 (5.21-7.01)	17.73 (16.26-19.31)	0.34 (0.29-0.41)	**<0.0005**
ACS Admissions	1.1 (0.76-1.54)	1.8 (1.35-2.34)	0.61 (0.38-0.96)	**0.02**
Total Deaths	5.7 (4.88-6.62)	6.9 (6.02-7.94)	0.82 (0.67-1.01)	0.06
ACDs	2.7 (2.14-3.36)	2.8 (2.20-3.43)	0.98 (0.71-1.34)	0.88
VDs	1.1 (0.76-1.54)	1.67 (1.24-2.20)	0.66 (0.41-1.04)	0.06
Traffic Acc. Deaths	0.13 (0.04-0.34)	0.67 (0.41-1.03)	0.2 (0.05-0.60)	**0.001**
CVDs	0.43 (0.23-0.74)	1.03 (0.70-1.47)	0.42 (0.20-0.82)	**0.007**

CI denotes confidence interval, IR: Incidence Rate, IRR: Incidence Rate Ratio, ACS: Acute Coronary Syndrome, ACDs: Acute Coronary Deaths, VDs, Violent Deaths, Traffic Acc. Deaths: Traffic Accident Deaths, CVDS: Cardiovascular Deaths other than ACDs (aortic aneurysm dissection/rupture, massive pulmonary embolism, intracerebral hemorrhage and sudden cardiac death secondary to underlying cardiomyopathy). p values in bold are meant for statistical significance, while IRR values <1 indicate a reduction of incidents in Covid-19 era.

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