

## CORRESPONDENCE

## Reduced Rate of Hospital Admissions for ACS during Covid-19 Outbreak in Northern Italy

**TO THE EDITOR:** To address the coronavirus (Covid-19) pandemic,<sup>1</sup> 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.<sup>2,3</sup> 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 for acute coronary syndrome (ACS) during the early days of the Covid-19 outbreak.

In this study, we performed a retrospective analysis of clinical and angiographic characteristics of consecutive patients who were admitted

for ACS at 15 hospitals in northern Italy. All the hospitals were hubs of local networks for treatment involving primary percutaneous coronary intervention. The study period was defined as the time between the first confirmed case of Covid-19 in Italy (February 20, 2020) and March 31, 2020. We compared hospitalization rates between the study period and two control periods: a corresponding period during the previous year (February 20 to March 31, 2019) and an earlier period during the same year (January 1 to February 19, 2020). The primary outcome was the overall rate of hospital admissions for ACS. We calculated incidence rates for the primary outcome by dividing the number of cumulative admissions

**Table 1.** Comparison of Hospital Admissions for Acute Coronary Syndrome (ACS) in Northern Italy between the Onset of the Covid-19 Outbreak and Two Control Periods.\*

ACS Subtype	No. of Patients	Study Period (N=547)	Control Periods	
			Same Year (N=899)	Previous Year (N=756)
All ACS	2202			
No. of daily admissions		13.3	18.0	18.9
Incidence rate ratio (95% CI)			0.74 (0.66–0.82)	0.70 (0.63–0.78)
P value			<0.001	<0.001
STEMI	957			
No. of daily admissions		6.1	7.8	8.0
Incidence rate ratio (95% CI)			0.77 (0.66–0.91)	0.75 (0.64–0.89)
NSTEMI	832			
No. of daily admissions		4.2	7.1	7.5
Incidence rate ratio (95% CI)			0.59 (0.49–0.71)	0.56 (0.46–0.67)
Unstable angina	413			
No. of daily admissions		3.1	3.1	3.4
Incidence rate ratio (95% CI)			1.00 (0.79–1.26)	0.91 (0.72–1.16)

\* The study period was defined as the time between the first confirmed case of Covid-19 in Italy (February 20, 2020) and March 31, 2020. The two control periods were from January 1 to February 19, 2020 (same year) and from February 20 to March 31, 2019 (previous year). The 95% confidence intervals are not adjusted for multiple testing and therefore should not be used to infer definitive effects. CI denotes confidence interval, NSTEMI non-ST-segment elevation myocardial infarction, and STEMI ST-segment elevation myocardial infarction.

by the number of days for each time period. Incidence rate ratios comparing the study period with each of the control periods were calculated with the use of Poisson regression. (Details regarding the study methods are provided in the Supplementary Appendix, available with the full text of this letter at NEJM.org.)

Of the 547 patients who were hospitalized for ACS during the study period, 420 (76.8%) were males; the mean ( $\pm$ SD) age was  $68\pm 12$  years. Of these patients, 248 (45.3%) presented with ST-segment elevation myocardial infarction (STEMI). The mean admission rate for ACS during the study period was 13.3 admissions per day. This rate was significantly lower than either the rate during the earlier period in the same year (total number of admissions, 899; 18.0 admissions per day; incidence rate ratio, 0.74; 95% confidence interval [CI], 0.66 to 0.82;  $P<0.001$ ) or the rate during the previous year (total number of admissions, 756; 18.9 admissions per day; incidence rate ratio, 0.70; 95% CI, 0.63 to 0.78;  $P<0.001$ ). The incidence rate ratios for individual ACS subtypes are presented in Table 1. After the national lockdown was implemented on March 8, 2020,<sup>4</sup> a further reduction in ACS admissions was reported. (Details regarding the full secondary analyses are provided in the Supplementary Appendix.)

This report shows a significant decrease in ACS-related hospitalization rates across several cardiovascular centers in northern Italy during the early days of the Covid-19 outbreak. Recent data suggest a significant increase in mortality during this period that was not fully explained by Covid-19 cases alone.<sup>5</sup> This observation and data from our study raise the question of whether some patients have died from ACS without seeking medical attention during the Covid-19 pandemic.

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