

COMMENTARY



Decreased in-hospital mortality in patients with COVID-19 pneumonia

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KEYWORDS COVID-19; mortality; age

Clinical manifestations of COVID-19 may range from asymptomatic to severe interstitial pneumonia with acute respiratory distress syndrome (ARDS) and death. COVID-19 mortality rates vary greatly [1] and the most reliable assessment of mortality comes from patients admitted due to severe cases of pneumonia [2].

At San Raffaele Hospital in Milano, Italy, we managed the COVID-19 outbreak with dynamic reorganization, and an increase in bed capacity. From 25 February until 13 May 2020, 950 consecutive adults were admitted, 68% were male and the mean age was 65 years (Table 1). Intensive Care Unit (ICU) beds raised progressively up to 56 beds with a proportion of 17% (range 10–20%) of the entire bed capacity.

Here, we report the mortality rates across time for COVID-19 patients admitted at our institution. Patients are divided into temporal quartiles of 20 days each. Date of last follow-up was 12 June 2020. Minimum follow-up of the last patients hospitalized was 30 days. A total of 129/950 (14%) patients required ICU. Of the 950 patients, 30-day mortality was 164/950 (17%), with a dramatic drop in the mortality rate after the first time quartile, decreasing from 24% to 2% (Figure 1). Age and time of admission were independent predictors of hospital mortality in the multivariate model (Table 1).

There are a number of possible reasons that may explain these findings. In our institution, the proportion of patients requiring ICU decreased over time from 17% to 7%, without significant changes in patients' age, suggesting a decreased severity of clinical presentation and progression. Understanding the pathophysiology of the disease [3], improving patients' management and treatments [4] targeted to specific pathways of hyper-inflammation and microvascular thrombosis associated with COVID-19 may have contributed to a reduction of mortality. The establishment of the national Italian lockdown from 9 March has been a cornerstone for limiting the SARS-CoV-2 spread, as well as the large use of respiratory protective devices and other measures of social distancing. Additionally, the co-infection of respiratory pathogens (i.e. seasonal influenza viruses) might have decreased, and this factor could have had an impact on disease severity.

Recent findings [5] highlight the possible correlation between the pollutant emissions and region-specific climatic features in the areas mostly impacted by the COVID-19 outbreaks. A concomitant reduction of air pollution could be associated with a further decrease in factors associated with morbidity. Finally, the tracking of virus population diversity in time through SARS-CoV-2 [6] mutations could potentially

Table 1. COVID-19 patients characteristic and logistic model for mortality.

COVID-19 patients characteristic	First quartile	Second quartile	Third quartile	Fourth quartile
Number of patients	284	445	167	54
Age, mean ± SD	66 ± 14	64 ± 14	65 ± 17	65 ± 18
Male, n (%)	213(75%)	300 (67%)	100 (60%)	35 (65%)
ICU, n (%)	48 (17%)	61 (14%)	16 (10%)	4 (7.4%)
Age for ICU patients, mean ± SD	60 ± 12	62 ± 9	60 ± 11	66 ± 19
Hospital stay over all, median (IQR)	14 (8–25)	14 (7–26)	13 (7–27)	17 (8–24)
Hospital stay for survivors, median (IQR)	15 (8–28)	15 (8–27)	14.5 (7–29)	17 (8–23)
Hospital stay for dead patients, median (IQR)	12 (7–22)	10 (5–20)	13 (5–22)	24 (24–24)
First data quartile	25/02/2020	16/03/2020	05/04/2020	24/04/2020
Last data quartile	15/03/2020	04/04/2020	23/04/2020	13/05/2020
Logistic model for mortality	Odds Ratio	P value	95% Confidence Interval	
Age	0.99	<0.0001	0.99	0.99
Based on first quartile (ref)				
Quartile 2	0.33	<0.0001	0.24	0.46
Quartile 3	0.39	<0.0001	0.25	0.61
Quartile 4	0.03	0.001	0.004	0.22

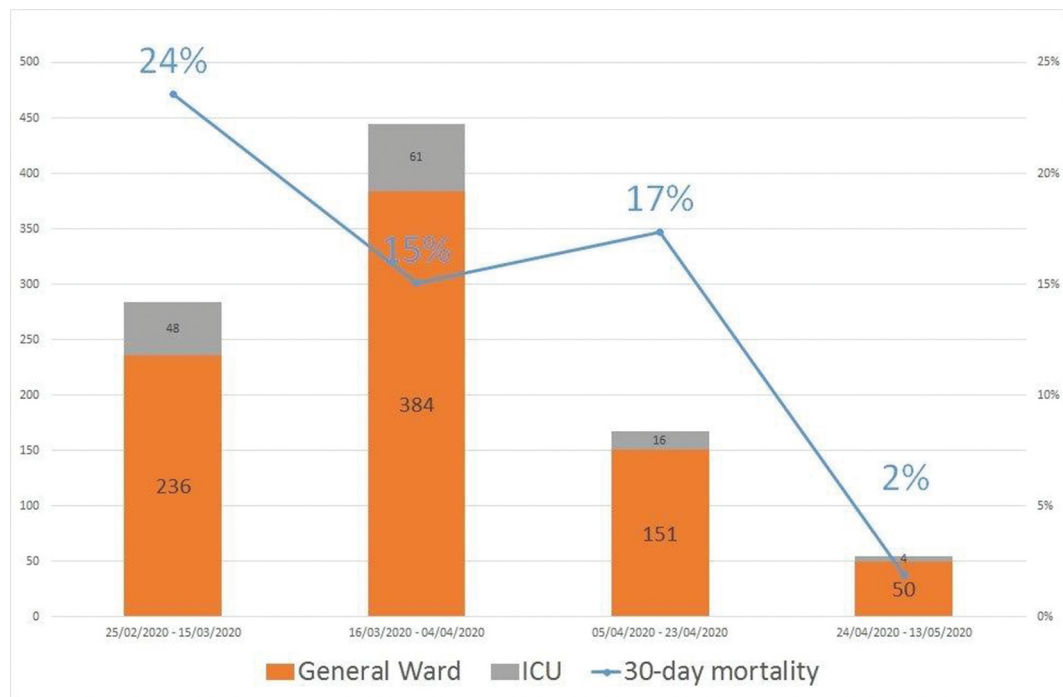


Figure 1. COVID-19 patients admitted in general wards and ICU per temporal quartiles and mortality rates.

establish a correlation of viral fitness and eventually viral attenuation with observed clinical outcomes. Our observation of a current reduction in the mortality of COVID-19 may contribute to the planning of social and economic measures during the post-pandemic phase.

Disclosure statement

No potential conflict of interest was reported by the authors.

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