LETTER TO THE EDITOR

COPD influences survival in patients affected by COVID-19, comparison between subjects admitted to an internal medicine unit, and subjects admitted to an intensive care unit: An Italian experience

Dear Editor,

In December 2019 a new viral infectious disease caused by severe acute syndrome coronavirus 2 (SARS-CoV-2) broke out causing coronavirus disease 2019 (COVID-19), emerging in China.[1–3] The disease spread in Europe including Italy since February 2020.

The transmission of the infection occurs mainly through salivary droplets.

The diagnosis is made by a nasal-pharyngeal swab test using quantitative reverse transcriptase polymerase chain reaction to identify the viral nucleic acid in respiratory specimens.[1,2]

The prevalent symptoms are fever, dry cough, exertional dyspnea frequently associated with the radiological finding of pneumonia.

Several complications could be found, such as acute respiratory distress syndrome, arrhythmia, septicemia.

Lung failure is the main consequence of COVID-19 pneumonia along with other possible multi-organ injuries.[4,5] Among the comorbidities influencing prognosis smoke-related the chronic obstructive pulmonary disease (COPD) should be taken into account due to the resulting imbalance in the perfusion ventilation ratio favoring oxygen arterial desaturation.[6]

COVID-19 can have different clinical manifestations in different age groups.[7] We know that elderly subjects are more affected by the disease.[8]

In our study we treated and followed COVID-19 hospitalized patients, we tried with this pilot study to better understand which factors are associated with the prognosis and focus on the differences in survival and general characteristics between patients hospitalized in wards with different intensity of care.

We analyzed retrospectively data regarding patients affected by COVID-19 admitted to S. Andrea Hospital from March 1 to May 31, 2020. Two groups were compared: a group of 120 patients admitted to an internal medicine unit who have been treated with oxygen therapy with a group of 75 patients admitted to an intensive care unit, where patients were treated with intubation and mechanical ventilation.

This study was approved by S. Andrea Hospital-Sapienza University Ethic Committee and a consent form has been provided by each patient.

Data were collected concerning lymphocytes total and subtypes count and lymphopenia state was defined as T-lymphocytes less than 60% and B-lymphocytes less than 10% of predicted value. Arterial PaO_2, flu vaccination, hypertension, pack-years, diabetes, and COPD were also evaluated as related conditions. COPD was detected based on a previous spirometry performed according to the GOLD guidelines.[9] Data considered were post-bronchodilator forced vital capacity (FVC), forced expiratory volume in 1 s (FEV1), recorded as percentage of predicted. COPD was diagnosed if FEV1/FVC rate was less than 70%. Complicated pneumonia was categorized as pneumonia associated with pleural effusion. Differences between Group 1 hospitalized in intensive care unit and Group 2 hospitalized in internal medicine unit were detected by Mann–Whitney or Fisher's exact test as appropriate and the Kaplan–Meir method with hazard ratio was applied to detect differences in survival between the groups. Data of survival were collected and available at 1, 3, and 6 weeks after the diagnosis of SARS-CoV-2 pneumonia.

In the whole population we found that mean age was 67.8 and mean pack-year 34.5, former smokers were 54%. The body mass index mean value was 25% and the main comorbidities were hypertension, COPD, diabetes. About 75% of the population developed lung failure which means a level of $PaO_2 < 55$ mmHg at rest.

Some differences were found at baseline in the comparison of patients hospitalized in an internal medicine unit defined Group G2 with patients hospitalized in an intensive care G1 (Table 1). Notably COPD was more present in G1 group with a significance of $p < .05$. Significant differences were also detected about PaO_2 mean level, hypertension and complicated pneumonia percentage of the whole population for each group that were more present in G1 than in G2 ($p < .04$, $p < .05$, $p < .03$, respectively).

The former smokers percentage was higher in G1 group, too ($p < .04$). No significant differences were detected about diabetes and flu vaccination.

In Table 2 the main factors affecting survival are represented among which COPD represents the highest risk factor associated with mortality along with cigarette smoking exposure (pack-years). The presence of COPD favors the development of hypoxemia and lung failure consistently as we know from scientific literature.[6]
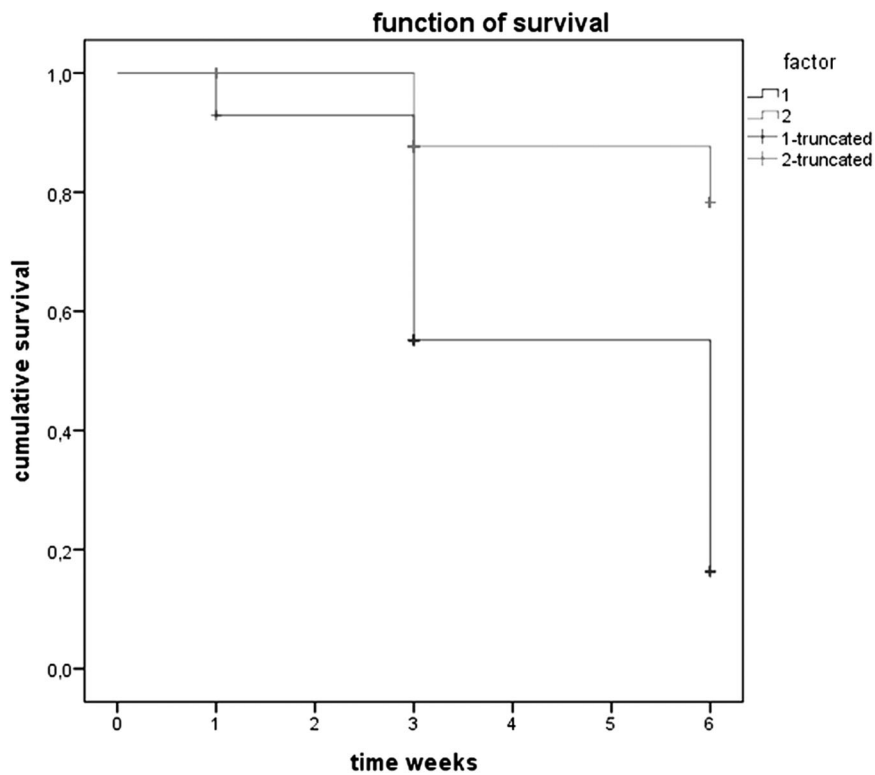
function of survival

FIGURE 1 Differences in overall survival between Group 1 (intensive care unit) and Group 2 (internal medicine unit) (HR 2.8; $p < .0001$)

TABLE 1 Differences between Group 2 admitted to the internal medicine unit and Group 1 admitted to the intensive care unit

	G2	G1	p
Age	63 (45–56)	60 (52–65)	.10
Pack-year	35.0 (32–40)	36.5 (35–40)	.17
Former smokers %	45	54	.04
Diabetes %	50	53	.15
COPD %	50	65	.05
Flu vaccination %	35	36	.20
Complicated pneumonia %	58	66	.03
Lymphopenia %	35	38	.10
Basal PaO$_2$ mmHg	55.1 (52.3–61.1)	50.4 (47.2–54.5)	.04
Hypertension %	38	42%	.05

Note: Mann–Whitney or Fisher's exact test as appropriate. Data expressed as median and interquartile range. G2 internal medicine unit. G1 intensive care unit. Values expressed as percentage indicating percentage of the whole population for each group.
Abbreviation: COPD, chronic obstructive pulmonary disease.

Figure 1 depicts the differences about the overall survival between the Group 1 treated in intensive care unit and Group 2 that was significant with a better survival detected in Group 2 ($p < .0001$).

In conclusion there is a different survival between patients hospitalized in a medicine internal unit and patients hospitalized in an intensive care unit. due to the basal differences in smoke exposure and

TABLE 2 Covariates associated with survival

	Exp-b	CI	p
COPD	2.96	1.1–5.0	.02
Diabetes	1.35	0.18–5.47	.5
Age	1.02	0.97–1.07	.9
Lymphopenia	1.16	0.46–2.88	.7
Hypertension	1.14	0.49–2.62	.7
Flu vaccination	0.95	0.65–1.17	.10
Bilateral pneumonia	0.79	0.20–3.0	.79
Pack-years	1.55	0.90–3.50	.05

Note: Cox proportional hazard regression.
Abbreviations: CI, confidence interval; COPD, chronic obstructive pulmonary disease.

comorbidities. Notably comorbidities, such as diabetes, hypertension and COPD were more present in patients admitted to an intensive care unit. COPD along with smoking exposure were the only co-factors which significantly affect the survival.

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DECLARATION

A consent form was provided by each patient.

Aldo Pezzuto[1] (iD)
Antonella Tammaro[2]
Giuseppe Tonini[3]
Massimo Ciccozzi[4] (iD)

[1]*Cardiovascular and Respiratory Sciences Department, Sant' Andrea Hospital-Sapienza University, Rome, Italy*
[2]*Department of Neurosciences Mental Health and Sensory Organs [NESMOS], Sapienza University of Rome, Rome, Italy*
[3]*Oncology Department, Campus Bio-Medico University, Rome, Italy*
[4]*Department of Epidemiology, Campus Bio-Medico University, Rome, Italy*

Correspondence

Aldo Pezzuto, Cardiovascular and Respiratory Department, S. Andrea Hospital-Sapienza University, Via di Grottarossa, 1035-39 Rome, Italy.
Email: pezzutoaldo@libero.it

ORCID

Aldo Pezzuto (iD) http://orcid.org/0000-0002-6626-2260
Massimo Ciccozzi (iD) http://orcid.org/0000-0003-3866-9239

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