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Venerable but Vulnerable: When Centenarians Encounter Coronavirus Disease 2019

To the Editor—The current pandemic of coronavirus disease 2019 (COVID-19) has reminded us of the extent of human exposure to infectious disease. Older age is one of the main causes of death in patients with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1, 2]. Centenarians, who overcame the 1918 flu pandemic, world wars, and communicable diseases such as polio or smallpox during the 20th century, are now facing a new health challenge. Although they are generally vulnerable, some centenarians seem to have a better prognosis than younger people against COVID-19.

In this study, we report the baseline characteristics and outcomes of COVID-19 centenarians included in the NOSO-COR Project (0.4% of 1380 patients) [3] or in the NOSO-COR 2 Project (0.4% of 785 patients) (no. CNIL 21 5255) and hospitalized in Lyon University hospitals (France) (Table 1).

In total, 9 centenarians, 7 females and 2 males, with a laboratory-confirmed COVID-19 diagnosis were hospitalized. All patients presented at least 1 comorbidity: 7 had cardiovascular diseases (mainly high blood pressure); 4 had chronic neurological disorders; and 4 had rheumatic syndromes. Six presented mild symptoms, particularly fever lower than 39°C, moderate weakness, and cough. Only 1 patient had anosmia and ageusia. Of the 5 patients with a chest x-ray available, 4 presented lung lesions. High levels of C-reactive protein were observed in 7 cases. Neutrophil-to-lymphocyte ratio was increased in 3 patients. Except for an observed increase in renal markers, creatinine, and urea in 3 deceased centenarians, other hematologic and chemistry data were in the range of normal values. Of the 3 patients with elevated renal markers, 2 had no known renal comorbidities. Three patients underwent ventilation and required the use of a high concentration mask. Antibiotics were prescribed in 6 patients, whereas 1 patient received both antibiotics and antiviral drugs. Four patients died during their hospital stay, 1 (n = 1), 7 (n = 2), and 37 days (n = 1), respectively, after admission to COVID-19-dedicated hospital ward. These patients have presented digestive disorders, confusion, shortness of breath, and renal failure at admission.

The results of our study showed that clinical features of COVID-19 in very old patients were very heterogeneous ranging from asymptomatic to severe disease with rapid disease progression and death. Similar atypical presentation was also reported for influenza and other respiratory viral infections [4]. The large majority of centenarians were female (77.8%). A longer life span in women than in men may partly explain the observed results. For example, in France, women represented 82% of centenarians in 2017 [5]. Furthermore, elderly women are known to be less affected by life-threatening diseases than their male counterparts [6]. In addition, higher COVID-19-related mortality rates were reported in males [2].

In summary, we observed that centenarians could recover from a SARS-CoV-2 infection. High SARS-CoV-2 antibody titers have been suggested to be associated with convalescence and recovery [7] and could explain the survival in some of our patients. More studies investigating other potential predictors of outcome (ie, nutrition, comorbidities) in this frail population are warranted.

Finally, no centenarian was transferred to intensive care units (ICUs) in our study. As reported in our previous publication [8], rapid management, thanks to earlier presentation at hospital, and/or shortage of intensive care resources in the context of a pandemic could impact the decisions about ICU admission in this population.

Considering the potential increase in the number of centenarians in the future, lessons learned from the COVID-19 pandemic should be kept in mind for better management of this population in case of a new emerging infectious disease.

PATIENT CONSENT

Patients had been informed of the objectives and their rights to refuse to participate in the study or withdraw at any time using simple, understandable terms. The data in this study come from data collected in the context of medical care. Therefore, in accordance with the French law, General Data Protection Regulation (RGPD), this study does not fall within the scope of research involving the human person and therefore does not require written consent from the patients included. For the NOSO-COR study, ethical approval was obtained from the clinical research and committee of Ile de France V on March 8, 2020. The registration number on ClinicalTrial.gov is NCT04290780. Ethical approval was obtained for NOSO-COR 2 from the committee of Hospices Civils de Lyon on December 31, 2020 and has been registered with the Commission Nationale de l'Informatique et Libertés (CNIL) under number 21_5255.

Table 1. Demographic, Clinical, and Laboratory Features in Nine Centenarians With COVID-19 Hospitalized at Lyon University Hospitals, 2020

Characteristics	Normal Values	Patient No. 1	Patient No. 2	Patient No. 3	Patient No. 4	Patient No. 5	Patient No. 6	Patient No. 7	Patient No. 8	Patient No. 9
Age in years		100	101	100	102	100	101	100	100	100
Sex		Female	Female	Female	Female	Female	Female	Male	Male	Female
Body mass index (kg/m²)		19.9	16.6	30.4	26.4	26.3	31.6	25.2	NK	14.3
Underlying conditions and comorbidities at admission		Chronic neurological disease, Rheumatic disease	Chronic neurological disease, Hypothyroidism	High blood pressure, Obesity	High blood pressure, Hypothyroidism diabetes	Chronic neurological disease, High blood pressure, Rheumatic disease	Chronic neurological disease, High blood pressure, Rheumatic disease	Cardiac rhythm disorder, Chronic pulmonary disease	High blood pressure, Obesity, Rheumatic disease, Renal disease, Chronic pulmonary disease, Urinary infection	High blood pressure, Dyslipidemia
Temperature at admission (°C)		38.6	36.8	36.7	38.1	38.4	37.0	38.2	37.4	36.2
Symptoms[a]		Fever, Diarrhea, General weakness	None	Fever, Cough, General weakness, Diarrhea, Nausea, Headache, Muscular pain	Fever, Cough, Confusion	Fever, Shortness of breath	Fever, Cough General weakness	Fever, Cough, Shortness of breath, Chills, General weakness, Ageusia, Anosmia, Anorexia, Cardiac symptoms	Shortness of breath, High blood pressure, General weakness, Renal failure	High blood pressure, Chest pain, Pulmonary embolism, Pleural effusion
Lung x-ray		Not performed	Not performed	Not performed	Abnormal	Not performed	Abnormal	Abnormal	Abnormal	Normal
COVID-19 acquisition (ECDC definition)[b]		Hospital-acquired	NA	Hospital-acquired	Community-acquired	Community-acquired	Community-acquired	Community-acquired	Community-acquired	Community-acquired
Delay between hospital admission and symptoms[c]		26	NA	463[d]	0	0	−1	0	−3	−1
Duration of symptoms in days		24	NA	29	7	1	11	35	9	4
COVID-19-related clinical features during hospital stay		None	None	Dyspnoea, Abnormal lung auscultation, Pharyngeal exudate, Constipation	Abnormal lung auscultation	Dyspnoea, Abnormal lung auscultation, Secondary bacterial infection	Abnormal lung auscultation	Abnormal lung auscultation, Secondary bacterial infection	Abnormal lung auscultation, Secondary bacterial infection	Abnormal lung auscultation
Biological Parameters[e]										
C reactive protein (mg/L)	<5	62.8	76	54.4	95.6	70.2	100.4	83.4	116	4.6
Neutrophile-to-lymphocyte ratio	<6	24.8	2.5	3.4	9.4	13.5	3.6	4.8	5.2	6
Treatments										
Antibiotics		None	NK	Beta-lactamase inhibitor	Beta-lactamase inhibitor	Cephalosporin	None	Cephalosporin, Quinolone	Penicillin, Quinolone	Other antibiotic
Antivirals		None	NK	Protease inhibitor	None	None	None	None	None	None
Outcome		Recovered	Recovered	Deceased	Deceased	Deceased	Recovered	Recovered	Deceased	Recovered

Abbreviations: COVID-19, coronavirus disease 2019; ECDC, European Centre for Disease Prevention and Control; NA, not applicable; NK, not known.

[a]Symptom at admission for community-acquired COVID-19 patients, or at suspicion for hospital-acquired or indeterminate COVID-19 patients.

[b]Surveillance definitions for COVID-19; European Centre for Disease Prevention and Control (https://www.ecdc.europa.eu/en/covid-19/surveillance/surveillance-definitions).

[c]Negative value means that onset of symptoms occurred before hospital admission, and zero indicates that patients were hospitalized the day of onset of symptoms.

[d]Patient hospitalized in rehabilitation ward since 2018.

[e]Collected on the day of COVID-19 diagnosis.

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