Descriptive study of a cohort of COVID-19 hospitalized patients in Spain

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Abstract

Background: Several descriptive cohort studies of patients affected by COVID-19 have been published. **Objective:** To describe the characteristics of patients with SARS-CoV-2 infection who were admitted to Hospital Universitario la Plana, Castellón, Spain. **Methods:** Retrospective, observational cohort study that included 18-year-old or older patients who were consecutively admitted with SARS-CoV2 confirmed infection. Demographic characteristics, comorbidities, clinical symptoms, laboratory results and radiological tests are described. **Results:** The study included 255 patients with a mean age of 70 years; 54.9 % were males. Most common comorbidities were high blood pressure (58 %), dyslipidemia (42.4 %), diabetes (25.5 %) and obesity (24.3 %). Median number of days from the onset of clinical symptoms prior to hospital admission was seven. Most common manifestations prior to admission were fever (74.5 %), dry cough (61.2 %), malaise (51.8 %) and dyspnea (51.0 %); 19 patients (7.4 %) were admitted to the intensive care unit, where mortality was 50 %; overall mortality was 16.9 %. **Conclusions:** Our cohort reflects similar characteristics to those of other European series. Mortality was lower than that in similar studies.

KEY WORDS: COVID-19. SARS-CoV-2. Viral pneumonia. Cohort study. Coronavirus.

Estudio descriptivo de una cohorte de pacientes con COVID-19 hospitalizados en España

Resumen

Antecedentes: Se han publicado varios estudios descriptivos de cohortes de pacientes afectados por COVID-19. **Objetivo:** Describir las características de pacientes con infección por SARS-CoV-2 que ingresaron al Hospital Universitario de La Plana, Castellón, España. **Métodos:** Estudio observacional de cohortes retrospectivo, que incluyó pacientes de 18 años o mayores que ingresaron en forma consecutiva con infección confirmada por SARS-CoV2; se describen características demográficas, comorbilidades, síntomas clínicos, resultados de laboratorio y pruebas radiológicas. **Resultados:** El estudio incluyó 255 pacientes con edad promedio de 70 años; 54.9 % fue del sexo masculino. Las comorbilidades más frecuentes fueron hipertensión arterial (58 %), dislipemia (42.4 %), diabetes (25.5 %) y obesidad (24.3 %). La mediana de días del inicio de

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síntomas clínicos antes del ingreso fue de siete. Las manifestaciones más frecuentes previas al ingreso fueron fiebre (74.5 %), tos seca (61.2 %), malestar general (51.8 %) y disnea (51.0 %); 19 pacientes (7.4 %) ingresaron a la unidad de cuidados intensivos, donde la mortalidad fue de 50 %; la mortalidad total fue de 16.9 %. Conclusiones: Nuestra cohorte refleja características similares a las de otras series europeas. La mortalidad fue inferior a la de estudios similares.

PALABRAS CLAVE: COVID-19. SARS-CoV-2. Neumonía viral. Estudio de cohortes. Coronavirus.

Introduction

In December 2019, Chinese health authorities reported a series of cases of patients with pneumonia, the causative agent of which was later identified as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). This virus has given rise to the current COVID-19 pandemic, declared by the World Health Organization in March 2020.¹

In Spain, the first patient with COVID-19 was recorded on January 31, 2020 in the Canary Islands,² but it was until February 25 when the first case was diagnosed at La Plana University Hospital, in Castellón, Spain, imported from Italy; it was the first in the Valencian Community and, at that time, there were less than 10 cases diagnosed in Spain.³ In Europe, the countries with most reported cases are Russia, the United Kingdom, Spain and Italy. In Spain, by June 14, 243,605 confirmed cases of SARS-CoV-2 infection had been reported, out of which 124,631 required hospitalization, 11,619 required Intensive Care Unit (ICU) admission and 27,136 had died.²

The impact of the COVID-19 pandemic has caused for health care systems to be overwhelmed at practically all hospitals of the public network and has forced the reorganization of all clinical departments. In addition, using resources of private hospitals and other health care support systems such as medicalized hotels, field hospitals and even sports centers has been necessary.⁴

The present study describes the demographic characteristics, comorbidities, clinical symptoms, laboratory and radiological test results of patients with SARS-CoV-2 infection at admission to La Plana University Hospital, in Castellón, Spain.

Methods

Retrospective, observational cohort study carried out at La Plana University Hospital, whose Health Department serves 187,258 inhabitants and has 258 hospital beds, including 12 in the ICU.

Patients aged 18 years or older, consecutively admitted from February 26 to May 20, 2020, with confirmed SARS-CoV-2 infection by real-time polymerase chain reaction (PCR) diagnostic test in a sample of nasopharyngeal aspirate or sputum were included. Due to possible false negative results, a second diagnostic test was performed if there was high clinical and radiological suspicion of infection. Patients with SARS-CoV-2 infection who attended the emergency department and who were discharged home were not included. Patients who refused to grant informed consent to receive treatment for SARS-CoV-2 infection, as well as those who were readmitted and pregnant or breastfeeding women were excluded.

Demographic data, comorbidities, clinical symptoms at admission, laboratory test results and radiological tests were obtained from the electronic medical record.

Analytical data were automatically downloaded from the Cointec Gestlab® 2020 program (v2.19.4.1493), and the blood pressure, temperature, heart and respiratory rate constants were downloaded from the Ingreso2 program, designed by the hospital Informatics Unit.

A form was programmed in the electronic medical record for safe collection of data that were not automatically downloaded from the information systems.

Personal data were dissociated from patients' identity for subsequent statistical analysis. To obtain survival data, follow-up was carried out until hospital discharge, transfer to another hospital, or death.

Quantitative variables are expressed using medians and interquartile ranges (IQR). Categorical variables are represented as absolute frequencies and percentages.

For the analysis of mean differences, Student's t-test was used for variables with normal distribution, and Mann-Whitney's test for variables with non-normal distribution.

Pearson's chi-square test or Fisher's exact test and, if necessary, Mantel-Haenszel's test for trend, were used to contrast categorical variables. Data analysis and statistical handling was carried out using SPSS

statistical program for Windows, version 19.0. The level of statistical significance adopted for all comparative tests was $p < 0.05$.

The study protocol was approved by the Ethics Committee for Research with Drugs prior to the study performance. Due to the retrospective, observational design of the research, exemption from requesting patient informed consent was obtained.

Results

The study included 255 patients, out of which 54.9 % were males; median age was 70 years, with this variable being significantly associated ($p < 0.01$) with dying during hospitalization; 52.8 % of the patients were older than 70 years of age, which is the age group in which more deaths occurred (Fig. 1). Forty-three of the 255 patients who were admitted for COVID-19 died, which represented a total mortality of 16.9 % in our cohort.

The most common comorbidities were high blood pressure (HBP, 58 %), dyslipidemia (42.4 %), diabetes (25.5 %) and obesity (24.3 %) (Table 1). Pulmonary diseases (including asthma, chronic obstructive pulmonary disease and other chronic respiratory conditions) were present in 54 patients (21.2 %), without being death predictors. HBP, diabetes, cardiovascular disease, chronic kidney disease, cerebrovascular disease, and dementia were significantly more common in patients who died than in those who survived (Table 1). Patients on home treatment with oral anticoagulation died more frequently than those who did not receive it ($p = 0.04$).

Regarding the recorded comorbidities, 12.2 % of the patients did not have any (Table 1), whereas 131 patients (51.4 %) had three or more. According to the Charlson comorbidity index (abbreviated version), median score was 1 (IQR = 0-2); 16.5 % of the patients ($n = 42$) had a high comorbidity index (≥ 3 points); 16.9 % of the patients who died belonged to the high comorbidity group in comparison with 13.2 % of those who survived. There was a significant global trend ($p = 0.005$) among the groups with low, medium and high comorbidity.

Median time from clinical symptoms onset prior to admission was seven days (IQR = 3-9). Most common clinical manifestations were fever (74.5 %), dry cough (61.2 %), malaise (51.8 %) and dyspnea (51.0 %), as shown in table 2. However, other symptoms, such as anosmia, ageusia, chest pain and sore throat were

Figure 1. Patients by age group, stratified according to whether death occurred or not.

uncommon (less than 10 %). Dyspnea was statistically significantly associated with death ($p = 0.007$).

Chest radiographic images suggestive of abnormalities were observed in 86.6 % of patients; the most common finding was ground glass opacity (Table 3). No significant differences were detected in the radiological pattern between deceased and surviving patients ($p = 0.57$). Respiratory conditions at admission were good, with a median $\text{SpO}_2/\text{FiO}_2$ (SF) ratio of 442.9 (IQR = 330.4-457.1), but significant differences were found between those who died (median = 317.9, IQR = 148.0-395.2) and the survivors (median = 447.6, IQR = 360.0-457.1), $p < 0.01$; 6.3 % of the patients ($n = 16$) had a SF ratio ≤ 300 and required non-invasive mechanical ventilation, and 9.1% ($n = 23$) had a SF ratio ≤ 200 and required invasive mechanical ventilation.

Table 4 describes the main laboratory results recorded in the patients at hospital admission. The pathological conditions related to patients' death were anemia (hemoglobin < 10 g/dL), D-dimer elevation (> 1000 $\mu\text{g/mL}$), CRP > 10 mg/dL, procalcitonin (> 0.5 ng/mL) and troponin elevated values (> 14 pg/mL) and kidney failure (glomerular filtration < 59 mL/minute/1.73 m^2). Anemia occurred more frequently ($p = 0.04$) in patients who died (23.8 %) than in those who survived (11.8 %). At admission, 75 % of the cases presented with elevated levels of ferritin (> 500 ng/mL), and 62.4 %, with elevated D-dimer (> 500 ng/mL); differences were statistically significant in these values between the groups of deceased and surviving patients (90.6 % vs. 72.4 %, $p = 0.03$). Elevated CRP (61.9 vs. 32.1 %) and procalcitonin (46.7 vs 17.6 %) at hospital admission were significantly related to mortality, as it occurred with troponin T elevation (94.7 % vs. 40.6 %) and kidney failure (73.8 % vs. 23.3 %).

Table 1. Demographic characteristics and comorbidities of patients with COVID-19 stratified according to the death outcome

	Total (n = 255)		Death (n = 43)		No death (n = 212)		p
Age, years (median and range)	70.0 (59.0-82.1)		82.1 (78.0-87.4)		66.8 (54.0-79.2)		< 0.01
	n	%	n	%	n	%	
Gender							
Males	140	54.9	19	44.2	121	57.1	0.12
Females	115	45.1	24	55.8	91	42.9	
HBP	148	58.0	35	81.4	113	53.3	< 0.01
Diabetes	65	25.5	18	41.9	47	22.2	< 0.01
Ischemic heart disease	23	9.0	5	11.6	18	8.5	0.51
Chronic kidney disease	49	19.2	20	46.5	29	13.7	< 0.01
COPD	21	8.2	5	11.6	16	7.5	0.38
Asthma	19	7.5	6	14.0	13	6.1	0.08
Other pulmonary chronic diseases	24	9.4	6	14.0	18	8.5	0.26
Heart failure	21	8.2	5	11.6	16	7.5	0.38
Cirrhosis	4	1.6	1	2.3	3	1.4	0.66
Neoplasm	31	12.2	8	18.6	23	10.8	0.16
Cardiovascular disease	71	27.8	18	41.9	53	25	0.03
Cerebrovascular disease	18	7.1	7	16.3	11	5.2	0.01
Dyslipidemia	108	42.4	17	39.5	91	42.9	0.68
Smoking							
Never smoked	192	75.3	37	86	155	73.1	0.14 [†]
Smoker	23	9	1	4.3	22	10.4	
Former smoker	40	15.7	5	11.6	35	16.5	
Obesity (BMI ≥ 30 kg/m ²)	62	24.3	11	25.6	51	24.1	0.83
HIV	4	1.6	1	2.3	3	1.4	0.66
Inflammatory bowel disease	6	2.4	1	2.3	5	2.4	0.99
Autoimmune diseases	15	5.9	3	7	12	5.7	0.74
Dementia	27	10.6	10	23.3	17	8.0	< 0.01
Pulmonary embolism or deep vein thrombosis	4	1.6	0	0.0	4	1.9	0.36
Rheumatoid arthritis	6	2.4	2	4.7	4	1.9	0.28
Home treatment							
Anticoagulant	30	11.8	9	20.9	21	9.9	0.04
ACEI or ARB II	115	45.1	21	48.8	94	44.3	0.59
Biological drugs	2	0.8	0	0.0	2	0.9	0.69

HBP = high blood pressure, COPD = chronic obstructive pulmonary disease, BMI = body mass index, HIV = human immunodeficiency virus, ACEI = angiotensin-converting enzyme inhibitor, ARB II = angiotensin II receptor blocker.

[†]Mantel-Haenszel test for trend.

Almost half the patients (47.4 %) had lymphopenia at admission (lymphocyte count < 1.0 x 10⁹/L), while 29.2 % had thrombocytopenia (platelet count < 150,000), without these disorders being related to mortality.

No significant relationship was found between mortality and lactate dehydrogenase and creatine

phosphokinase elevated levels, albuminemia, or prolonged prothrombin or activated partial thromboplastin times.

When the CURB-65 scale was applied at hospital admission, 34 patients (13.5 %) had severe risk and, therefore, required ICU admission; 28.7 % required

Table 2. Signs and symptoms patients presented with at admission

Sign and/or symptom	Total (n = 255)		Death (n = 43)		No death (n = 212)		p
	n	%	n	%	n	%	
Fever	190	74.5	32	74.4	158	74.5	0.99
Dyspnea	130	51.0	30	69.8	100	47.2	< 0.01
Dry cough	156	61.2	23	53.5	133	62.7	0.26
Expectoration	36	14.1	7	16.3	29	13.7	0.66
Sore throat	19	7.5	1	2.3	18	8.5	0.21
Myalgia	53	20.8	7	16.3	46	21.7	0.43
Headache	28	11.0	1	2.3	27	12.7	0.06
Dizziness	19	7.5	2	4.7	17	8.0	0.75
Diarrhea	58	22.7	11	25.6	47	22.2	0.63
Chest pain	18	7.1	1	2.3	17	8.0	0.32
Malaise	132	51.8	21	48.8	111	52.4	0.67
Anosmia	18	7.1	0	0.0	18	8.5	0.05
Ageusia	19	7.5	1	2.3	18	8.5	0.21

Table 3. Chest X-ray results

Result	Total (n = 255)		Death (n = 43)		No death (n = 212)		p
	n	%	n	%	n	%	
Normal	34	13.4	4	9.3	30	14.2	0.57†
Opacities	130	51.0	22	51.2	108	50.9	
Interstitial pattern	80	31.4	16	37.2	64	30.2	
Non-COVID-19 lesions	11	4.3	1	2.3	10	4.7	

†Mantel-Haenszel test for trend.

hospital admission due to medium risk and 56.9 % did not require admission. Nine patients were directly admitted to the ICU from the Emergency Department; median hospital length of stay was eight days (IQR = 5-15), although it was longer in patients who survived (nine days, IQR = 6-17) in comparison with those who died (five days, IQR = 2.5-9.5), with no significant differences ($p = 0.08$).

Nineteen patients (7.4 %) required ICU admission, out of whom nine were transferred to other hospitals. Median ICU length of stay was 34 days (IQR = 26-45), with no significant differences ($p = 0.66$) between those

who died and those who survived: 32 (IQR = 26-42) and 36 days (IQR = 30-45), respectively. ICU-admitted patients mortality was 50 %, with patients having a five-fold higher risk of dying when admitted to said unit (OR = 5.4; 95 % CI = 1.5-19.7; $p < 0.01$).

Discussion

Substantial differences have been observed between COVID-19 cohorts from Asian⁵⁻¹⁰ and Western countries.¹¹⁻¹⁶ In general, studies published in China included younger patients, aged between 47 and 56 years,^{5,8} unlike patients in our study and the rest of the western cohorts,¹¹⁻¹⁶ in whom age was higher than 60 years. However, there were no differences in the proportion of men and women in the different studies.

Our patients had multiple comorbidities: high blood pressure, dyslipidemia and diabetes, among the most common, similar to those of other previously published series.¹¹⁻¹⁶ These findings were not reported in early studies. Thus, in the series by Guan et al.,⁵ only 15 % had HBP and 7.4 % had diabetes; in other Chinese series,^{8,10} 30 % of patients with HBP and 10 % with diabetes were recorded. These differences may be due to the fact that these were younger populations with less comorbidities.

On the other hand, the prevalence of HBP in the Spanish population¹⁷ is 42.6 %, which is lower than that observed in our patients (58 %). Possibly there is a higher susceptibility to being infected by SARS-CoV-2 due to an overexpression of angiotensin-converting enzyme 2 in these patients.¹⁸ We found a lower prevalence of obesity in our patients (23.4 %) than that reported by Richardson et al.¹¹ in New York (41.7 %), due to a different prevalence of this condition in the North American population. The other studied comorbidities were less common: the prevalence of chronic obstructive pulmonary disease of 8.2 % in our cohort was lower than the prevalence of 10.2 % identified in the Spanish population.¹⁹ As shown in table 1, the main predictors of mortality at admission were age, HBP, diabetes, chronic kidney disease, dementia, cardiovascular and cerebrovascular disease, as in another study in Spanish population. Borobia et al.¹⁶ found, in addition, higher mortality in patients with chronic obstructive pulmonary disease, rheumatic disease, and previous history of neoplasms.

The most common symptoms at admission were those that have been previously described:⁵⁻¹⁰ fever, dry cough, malaise and dyspnea, but only dyspnea at

Table 4. Laboratory test results of patients with COVID 19 at hospital admission

Laboratory test	Performed tests	Total	Death (n = 43)	No death (n = 212)	p	Reference range*
	n	Median (IQR)	Median (IQR)	Median (IQR)		
Leukocytes (absolute count $\times 10^9/L$)	255	6.3 (5.0-8.7)	6,8 (5.4-9.7)	6.2 (4.9-8.7)	0.18	4.80-11.00
Neutrophils (absolute count $\times 10^9/L$)	255	4.7 (3.3-6.9)	5.5 (4.5-7.5)	4,6 (3.2-6.8)	0.02	1.90-8.00
Lymphocytes (count $\times 10^9/L$)	255	1.0 (0.7-1.4)	0.8 (0.5-1.2)	1,0 (0.7-1.4)	0.03	0.90-4.50
Platelets (count $\times 10^9/L$)	255	183 (143-235)	174 (145-212)	186 (143-236)	0.13	130-400
Hemoglobin (g/dL)	255	13.8 (12.8-14.9)	12.9 (12.2-14.4)	13.9 (12.9-15.0)	0.02	12.0-18.0
D-dimer ($\mu g/mL$)	236	762.0 (497.5-1321.5)	1222,5 (806.0-1894.0)	701,0 (473.5-1241.5)	0.23	0-500
Prothrombin time (seconds)	250	13.1 (12.1-14.2)	12,8 (12.1-15.1)	13,2 (12.1-14.2)	0.48	9-13
Activated partial thromboplastin time (seconds)	220	30.35 (28.50-33.30)	31,00 (29.40-36.60)	30,20 (28.20-32.90)	0.40	20-40
Fibrinogen (mg/dL)	9	662.5 (578.0-880.0)	NA	662,5 (578.0-880.0)	NA	200-400
Glycaemia (mg/dL)	253	121.0 (106.0-143.0)	134,5 (118.0-200.0)	118,0 (106.0-145.5)	0.03	82-115
Serum creatinine (mg/dL)	252	0.95 (0.75-1.23)	1,24 (0.99-1.73)	0,91 (0.73-1.14)	< 0.01	0.70-1.20
Serum urea (mg/dL)	253	38.0 (28.0-57.0)	58,0 (40.0-99.0)	36,0 (27.0-51.5)	< 0.01	10-71
Glomerular filtration (CKD-EPI, mL/min/1.73 m ²)	252	77.42 (51.42-93.70)	44,03 (31.36-59.31)	82,35 (59.75-97.32)	< 0.01	GF > 90 (normal)
Sodium ion (mmol/L)	250	138.95 (136.50-141.20)	138,05 (136.20-141.40)	139,10 (136.55-141.15)	0.78	136-146
Potassium ion (mmol/L)	224	4.24 (3.88-4.48)	4.33 (3.92-4.63)	4.22 (3.88-4.44)	0.06	3.5-5.1
Phosphate (mg/dL)	113	2.91 (2.53-3.38)	3,10 (2.72-4.55)	2.90 (2.49-3.32)	0,04	2.7-4.5
Total calcium (mg/dL)	111	9.20 (8.75-9.50)	9,40 (8.80-9.90)	9.20 (8.75-9.45)	0.35	8.8-10.2
Albumin (g/dL)	113	3.87 (3.41-4.11)	3.36 (3.04-3.97)	3.91 (3.55-4.12)	< 0.01	3.97-4.94
Total bilirubin (mg/dL)	123	0.52 (0.34-0.65)	0.56 (0.45-0.77)	0.51 (0.42-0.63)	0.07	0.1-1.2
Aspartate aminotransferase (IU/L)	60	63.4 (49.7-95.9)	65.4 (54.6-106.3)	64.8 (49.2-95.9)	0.85	5-40
Alanine aminotransferase (IU/L)	222	25.2 (16.0-40.5)	19,9 (15.4-35.2)	26.9 (16.5-42.0)	0.29	5-41
Total creatine phosphokinase (IU/L)	171	91.0 (55.0-149.5)	87.0 (68.0-153.0)	91.0 (54.0-146.0)	0.29	39-308

(Continued)

Table 4. Laboratory test results of patients with COVID 19 at hospital admission (*Continued*)

Laboratory test	Performed tests	Total	Death (n = 43)	No death (n = 212)	p	Reference range*
	n	Median (IQR)	Median (IQR)	Median (IQR)		
Lactate dehydrogenase (IU/L)	218	284.0 (221.0-397.5)	349.0 (279.5-483.0)	277.5 (220.0-380.0)	0.09	135-225
CRP (mg/dL)	251	7.32 (2.97-12.8)	12.47 (8.45-21.19)	5.59 (2.44-11.78)	< 0.01	0.1-1.0
Procalcitonin (ng/mL)	115	0.100 (0.080-0.330)	0.388 (0.164-1.125)	0.118 (0.075-0.270)	0.68	0.0-0.5
Ferritin (ng/mL)	175	741.5 (337.9-1440.4)	1278.8 (561.2-1757.2)	724.2 (313.2-1242.2)	0.25	30-400
Troponin T (pg/mL)	117	13.98 (6.84-29.73)	41.13 (24.52-109.50)	12.64 (6.23-23.66)	0.06	Limite superior: 14
Interleukin-6 (pg/mL)	9	25.70 (17.34-75.53)	131.27 (39.63-487.25)	24.83 (17.34-25.70)	0.27	0-8

*Provided by La Plana University Hospital Clinical Laboratory Department.
IQR = interquartile range, NA = non-assessable, CRP = C-reactive protein.

admission was associated with the risk of dying, unlike the findings of Borobia et al.,¹⁶ who recorded more predictive symptoms of mortality at admission: cough, headache, diarrhea, myalgia, expectoration, anosmia, nausea and vomiting.

Pathological findings were recorded in 86.6 % of the radiological studies obtained at admission, which is a higher prevalence than in other series,^{5,10} which may indicate a more advanced evolution of the disease, possibly because patients attended the hospital later. Indeed, our patients had clinical symptoms seven days before admission.

In our series, similar to other studies,^{5,8,11} we observed lymphopenia, albuminemia, and elevated levels of D-dimer, lactate dehydrogenase, CRP and serum ferritin, which is consistent with a pro-inflammatory profile at patient admission. Nineteen patients (7.4%) required ICU admission, out of whom nine had to be transferred to other hospitals' ICUs, which is a lower number than that reported in other series,^{8,11,13,15} where values ranging from 14.2 to 30 % were reached.

Forty-three patients of our cohort died, which represents an overall mortality of 16.8 %; the prevalence of death was higher in patients who were admitted to the ICU (50 %), as reported in other series.¹¹ If we had included two deceased patients from those who were transferred to other hospitals' ICUs, mortality would have been 17.6 %, although it would still be lower than the 21.2 % mortality reported by Richardson¹¹ or 26 % recorded in the ISARIC cohort.¹⁵ In

another Spanish series, lower mortality was also recorded (20.7 %),¹⁶ as in our research. As observed in figure 1, the highest mortality was concentrated in those older than 60 years (97.7 %), similar to the finding of Borobia (95.8 %).¹⁶

Mortality both in Europe and the United States is higher than in China: Guan et al.⁵ reported a mortality of 1.4 %, and Wang et al.,⁸ 4.3 %.

Our study is not without limitations. Given that it was carried out in a single hospital center, there could be a bias resulting from differences in clinical practice, which we tried to reduce with the use of nationally approved treatment recommendations. Since it is a retrospective study, causality relationships cannot be extracted with regard to the findings that were recorded, which shall be corroborated with prospective analyses.

In conclusion, the characteristics of patients treated for COVID-19 at La Plana University Hospital, in Castellón, Spain, reflect characteristics that are similar to those of other European series, but different from those recorded in the Chinese or North American population. Mortality in our study was lower than in other similar populations.

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Conflict of interests

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