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ORIGINAL ARTICLE

Health impact on the elderly survivors of COVID-19: Six months follow up

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ABSTRACT

Purpose: To analyse factors associated with mortality at 6 months in survivors older than 70 years after hospital admission for SARS-CoV-2.
Methods: Descriptive observational study with follow-up at 6 months. All patients over 70 years of age, discharged from the Hospital Central de la Cruz Roja, after hospitalization for COVID-19 consecutively during the months March to May 2020 were included. The outcome at 6 months (mortality, readmissions) were collected.
Results: A total of 165 patients were included. Mean age 88.5 ± 6.73, women 69.1%. High comorbidity 33.9%. Mean previous Barthel Index was 65.39 ± 33.64 and at discharge 58.12 ± 34.04.
24.2% had severe polypharmacy and 47.9% severe frailty.

Six months after hospital discharge, 13% died and 23.8% required at least one readmission. More than half of the sample had some of the following sequelae: dyspnea 20%(33), functional impairment 41.7%(69), cognitive impairment 31.3%(52) or depressive symptoms 42.4%(70).

Functional impairment at discharge was associated with an increased risk of mortality (OR 5.33; 95% CI 1.11–25.73).
Conclusions: The functional status was a factor associated with risk of mortality at 6 months.

Impacto en la salud de los ancianos supervivientes de COVID-19: seguimiento a los 6 meses

Palabras clave:
Deterioro funcional
Mortalidad
Superviviente
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RESUMEN

Objetivo: Analizar los factores asociados a la mortalidad a los 6 meses en los supervivientes mayores de 70 años tras el ingreso hospitalario por SARS-CoV-2.
Métodos: Estudio observacional descriptivo con seguimiento a los 6 meses. Se incluyeron todos los pacientes mayores de 70 años, dados de alta en el Hospital Central de la Cruz Roja, tras ingreso hospitalario por COVID-19 de forma consecutiva durante los meses de marzo a mayo de 2020. Se recogieron los resultados a los 6 meses (mortalidad, reingresos).
Resultados: Se incluyeron 165 pacientes. Edad media: 88,5 ± 6,73, mujeres: 69,1%. Alta comorbilidad del 33,9%. La media del índice de Barthel previo fue de 65,39 ± 33,64 y al alta 58,12 ± 34,04. El 24,2% tenía polifarmacia severa y el 47,9% fragilidad severa.
Seis meses después del alta hospitalaria, el 13% falleció y el 23,8% requirió al menos un reingreso. Más de la mitad de la muestra tenía alguna de las siguientes secuelas: disnea el 20% (33), deterioro funcional el 41,7% (69), deterioro cognitivo el 31,3% (52) o síntomas depresivos el 42,4% (70).

El deterioro funcional al alta se asoció a un mayor riesgo de mortalidad (OR: 5,33; IC 95%: 1,11-25,73).
Conclusiones: El estado funcional fue un factor asociado al riesgo de mortalidad a los 6 meses.

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Introduction

The COVID-19 pandemic has had a devastating impact on the elderly. The report of the National Epidemiological Surveillance Network about the situation of COVID-19 in Spain, reported that since the beginning of the pandemic until May 21, 2020, 37.3% of the infected population was older than 70 years with a mortality rate of 87% of the total infected population at that time[1]; while from June to the present this percentage decreases to 11.4% with a mortality rate of 41.9%.[2] This shows that this population is a very affected age group.

Data on the medium- and long-term consequences on the health status of elderly people who have been affected by COVID-19[3] are still limited.

The follow-up of these patients represents a new healthcare need that requires a multidisciplinary, protocolized and equitable approach throughout the National Health System.[4]

Therefore, this brief report aims to analyse factors associated with mortality, at 6 months in survivors older than 70 years after hospital admission for SARS-CoV-2.

Materials & methods

Longitudinal observational study of patients > 70 years discharged from the Hospital Central de la Cruz Roja, Madrid, from 20 March to 31 May 2020 with a diagnosis of SARS-CoV-2 infection, defined according to PCR confirmation criteria or as suspected cases according to compatible clinical, analytical and/or radiological data. OCTA-COVID Cohort.

Data collection process

At admission, socio-demographic variables were collected from the clinical history (age, sex); comorbidity (Charlson Index, >2 high comorbidity); polypharmacy, the Quick Sepsis related Organ Failure Assessment score (Q-Sofa) ≥2 as high risk of mortality in suspected sepsis. Functional status using Barthel Index (BI) (independent: 100, mild dependency: 60–99, moderate dependency: 40–59, severe dependency: 20–39 and maximum dependency: 0–19 points). Cognitive status with Red Cross Mental (RCM) which ranges from 0 (no cognitive impairment) to 5 (severe cognitive impairment), ≥2 as dementia. Frailty using the Clinical Frailty Scale (CFS), 1–4 as non-frail, 5–6 as mildly to moderately frail and 7–9 as severely frail.

At discharge, functional impairment at discharge(decrease ≥ 10 points in the BI at discharge compared to the baseline) and length of hospital stay.

At 6 months post-discharge, the functional impairment (decrease ≥ 10 points in the BI compared to the baseline); cognitive impairment (decrease of 1 point on the RCMS compared to the baseline); and depressive semiology (the presentation of one or more of the criteria for the diagnosis of depressive disorder in the Diagnostic and Statistical Manual of Mental Disorders-V (DSM-V) were collected by a telephone interview with the patient or with a family member/nursing home staff if patient has dementia.

The following outcome variables were collected: mortality and hospital readmission were collected from the computerized primary care program.

Statistical analysis

Continuous variables are descriptively summarized using the mean ± standard deviation (SD), and categorical variables are expressed as percentages. Student's t test was used to compare the quantitative variables, and the χ^2 test for categorical variables. The influence of the baseline variables on the outcome variables at 6 months was analysed by binary logistic regression model, calculating the odds ratio (OR) and the corresponding 95% confidence interval (CI). The significant baseline variables in the univariate analysis were adjusted for age and sex. The statistical analysis was performed in SPSS 26.0.

Table 1
Baseline characteristics of the study sample of >70 years old survivors of SARS-CoV-2 infection Total(165).

Age (years, SD)	88.5 ± 6.73
Female (%)	69.1
Charlson Index > 2 (%)	33.9
Stroke	39 (23.6)
Kidney failure	28 (17.0)
Chronic obstructive pulmonary disease	24 (14.5)
Cardiovascular disease	23 (13.9)
Hypertension	112 (67.9)
Diabetes Mellitus	35 (21.2)
Heart failure	36 (21.8)
Atrial fibrillation	37 (22.4)
Depression (%)	51
Dementia (RCM ≥ 2) (%)	43.6
Polypharmacy (%)	
<5	32.1
5–9	43.6
≥10	24.2
Barthel Index previous (p, SD)	65.39 ± 33.64
Barthel Index at discharge (p, SD)	58.12 ± 34.04
Functional impairment at discharge (%)	23.6
Clinical Frailty Scale (CFS %)	
1–4	27.3
5–6	24.8
7–9	47.9
Nursing home (%)	65.6
Q-Sofa ≥ 2 (%)	13.3
Length of hospitalization (days)	15.63 ± 8.63

Ethical approval

The study was approved by the Clinical Research Ethics Committee of the Hospital Universitario de La Paz, Madrid, registered PI-4131.

Results

During the period from March 20 to May 31, 2020, 300 patients over 70 years of age were admitted with an in-hospital mortality of 38%. 187 were discharged: 8 were readmitted 48 h after discharge and 14 were excluded because of consent refusal, resulting in a total sample of 165 patients.

The baseline characteristics of the sample are shown in Table 1.

At 6 months there was no loss to follow up, 21 patients (13%) died in hospital and 23.8%(39) required at least one readmission to hospital. Of those who died, 57%(12) occurred in the first month post-discharge, the main causes being respiratory 57.14%(12) and cardiac 14.29%(3) pathologies; the most frequent causes of readmission were respiratory 36.1%(14), cardiological 25%(10) and urinary 16.7%(6) pathologies. Of the survivors at 6 months, more than half of the sample had some of the following sequelae: dyspnoea 20%(33), functional impairment 41.7%(69), cognitive impairment 31.3%(52) or depressive symptoms 42.4%(70).

Baseline differences between survivors and non survivors are shown in Table 2. High comorbidity (CI > 2, $p = 0.04$) and worse functional status (Barthel Index previous and at discharge ($p < 0.05$)) were significantly different between those surviving and not. In the multivariate analysis, functional impairment at

Table 2
Bivariate and multivariate analysis of baseline variables associated to mortality risk.

	Death	Alive	*p*	OR (CI 95%)
Age (years, SD)	85.33 ± 7.57	86 ± 6.46	0.66	
Female (%)	61.9	38.1	0.49	
Charlson Index > 2 (%)	52.4	31.3	0.04	1 (0.18–5.65)
Stroke	11 (52.4)	28 (19.4)	0.11	
Kidney failure	4 (19)	24 (16.7)	0.79	
Chronic obstructive pulmonary disease	4 (19)	20 (13.9)	0.54	
Cardiovascular disease	6 (28.6)	17 (11.8)	0.14	
Hypertension	11 (52.4)	101 (70.1)	0.10	
Diabetes Mellitus	6 (28.6)	29 (20.1)	0.39	
Heart failure	7 (33.3)	29 (20.1)	0.17	
Atrial fibrillation	2 (9.5)	35 (24.3)	0.13	
Depression (%)	61.9	34.7	0.12	
Dementia (RCM ≥ 2) (%)	57.1	41	0.16	
Polypharmacy (%)				
<5	28.6	32.6		
5–9	38.1	44.4	0.58	
≥10	33.3	22.9		
Barthel Index previous (p, SD)	40 ± 34.46	69.1 ± 31.98	0.001	4.96 (2.04–12.1)
Barthel Index at discharge (p, SD)	30.71 ± 26.47	62.11 ± 33.24	<0.001	3.5 (1.43–8.6)
Functional impairment at discharge(%)	38.1	22.9	0.04	5.33 (1.11–25.73)
Clinical Frailty Scale (CFS %)				
1–4	9.5	33.3		–
5–6	14.3	29.2	0.003	1.83 (0.37–9.08)
7–9	76.2	37.5		7.08 (0.79–27.98)
Nursing home (%)	76.2%	63.9%	0.27	
Q-Sofa ≥ 2 (%)	14.3	13.2	0.89	
Lenght of hospitalization (days)	16 ± 9.69	15.57 ± 8.51	0.81	

discharge was associated with a higher risk of mortality. No significant associations were found with respect to those related to readmission at 6 months.

Discussion

We describe the health status after hospitalisation for COVID-19 in a cohort of patients older than 70 years who survived admission.

The OCTA-COVID study[5] describes in-hospital mortality in 37%; and the presence of delirium, dementia and high CURB-65 values as predictors of mortality. High comorbidity and frailty[6] are topics relation with mortality in other studies.

Mortality at 6 months was 13%, lower than that described by *Walle Hansen* in a cohort of patients over 60 years of age (21%),[7] in a younger population and a quarter developed severe covid, twice as many as in the present sample, which could explain the higher mortality of that study in comparison to this one. The readmission rate of 23.8% was very similar to that described in the 3-month follow-up (20%), with respiratory pathology being the main cause.

The incidence of post-hospitalisation functional impairment 6 months after discharge was 41.7% higher than that described at 3 months (27.2%), which could be related to dyspnoea as a persistent symptom limiting ambulation and the performance of basic activities of daily living. According to *Lloyd*,[8] the presence or absence of functional recovery after 1 month was associated with long-term outcome

A functional dependence is described as factor associated with mortality and readmission,[9] which highlights the need for early follow-up of this group affected by a new disease that is impacting on all areas of comprehensive geriatric assessment.

Despite the limitations of our study, such as the small sample size and being a single-center study, we would like to highlight the prevalence of functional impairment that is usually underrepresented in research studies.

Conclusions

Of the survivors, 4 out of 10 had functional impairment, 3 out of 10 cognitive impairment, and 4 out of 10 depressive symptoms at 6 months after surviving COIVD-19.

Previous and discharge functional status are independently associated with mortality.

Functional status was a factor associated with the risk of mortality at 6 months. All this highlights the role of functional status in the impact on health after the consequences of surviving COVID-19.

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Conflict of interest

None.

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