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Functional Outcomes of Severe COVID-19 Patients After a Post-Acute Care Hospitalization

To the Editor:

Patients hospitalized for severe coronavirus disease 2019 (COVID-19) may present with persistent symptoms and functional impairment for months after infection.[1,2] A proportion of those patients may need further hospitalization for rehabilitation or proper care transition.[3] However, little is known about outcomes after such hospitalizations.[4] We assessed long-term outcomes of patients admitted to a post-acute care facility (PACF) after a severe COVID-19 hospitalization.

Our study evaluated a cohort of patients with severe COVID-19 treated at a 60-bed private PACF in Brazil. Data were collected at PACF admission, discharge, and follow-up by telephone. Functional status was assessed by modified Barthel Index (20-100 points).[5] Mental health symptoms and quality of life were assessed by the Hospital Anxiety and Depression Scale (HADS) and the EQ-5D-3L score, respectively. Categorical variables with repeated measures were compared with Friedman test and a *P* value <.05 was considered significant. This study was approved by the institutional review board (Hospital das Clinicas da Faculdade de Medicina da Universidade de Sao Paulo (HCFMUSP), number 43277021.7.0000.0068), and informed consent was obtained from participants.

We report the first 100 patients admitted at the PACF after severe COVID-19 from April 2020 to April 2021. Follow-up was performed until June 8, 2021.

Patients were admitted to the PACF from 12 different hospitals, with a median (interquartile range) of 33 (23-42) days from symptom onset. The mean age was 65 ± 15 years, and 63 (63%) were male. Mean Charlson Comorbidity Index was 2.5 ± 1.9, and 86 (86%) were independent for all activities of daily living before hospitalization. Patients were hospitalized for 32 (24-42) days before transition to PACF, and 91 (91%) were admitted in the intensive care unit, 79 (79%) received invasive mechanical ventilation, and 3 (3%) received extracorporeal membrane oxygenation during the original hospitalization.

At admission to the PACF, 41 (41%) patients were in use of tracheostomy tube, 52 (52%) with tube feeding, 63 (63%) needed oxygen supplementation, and 5 (5%) were mechanically ventilated. Median PACF length of stay was 28 (15-46) days. Nine (9%) patients were readmitted to an acute care hospital due to

Table 1
Functional Status, Burden of Symptoms, and Quality of Life at Follow-up (n = 79)

Characteristics	Value
MBI*, mean ± SD	43.4 ± 12
EQ-5D-3L score†, mean ± SD	0.69 ± 0.27
HADS‡ anxiety, mean ± SD	3.55 ± 4.62
HADS depression, mean ± SD	3.13 ± 5.28
Prolonged symptoms, n (%)	
Dyspnea	19 (23)
Cough	38 (46)
Pain	40 (48)
Fatigue	50 (60)
Anosmia	6 (7)
Headache	20 (24)
Perceived quality of life as compared to before COVID-19, n (%)	
Much worse	18 (22)
Worse	29 (35)
Similar	15 (18)
Better	20 (24)
Much better	1 (1)

HADS, Hospital Anxiety and Depression Scale; MBI, modified Barthel Index.
*Modified Barthel Index (20-100, with 20 being complete dependence and 100 being complete independence).
†EQ-5D-3L health state index scores generally range from less than 0 (where 0 is a health state equivalent to death; negative values indicate a state worse than death) to 1 (perfect health).
‡HADS is assessed in 2 dimensions: anxiety and depression. Each dimension scores from 0 to 21 (higher scores indicating greater chance of symptoms). A score ≥9 is usually interpreted as a cutoff.

clinical deterioration and 12 (12%) patients died during PACF hospitalization.

At follow-up, for a median (interquartile range) of 54 (40-91) days after PACF discharge and 142 (109-276) days after symptom onset, of the 79 patients discharged alive, 2 (2.5%) died, 12 (15%) were readmitted to an acute care hospital, and 70 (88%) reported at least 1 persistent symptom (Table 1). Of the 45 patients with active work life before hospitalization, 19 (42%) returned to previous level of work during the follow-up period. At follow-up, mean ± SD scores for modified Barthel Index, EQ-5D-3L, and Hospital Anxiety and Depression Scale anxiety and depression subscale scores were 87 ± 27, 0.69 ± 0.27, 3.55 ± 4.62, and 3.13 ± 5.18, respectively. Participants rated perceived quality of life as much worse, worse, similar, better, and much better in 14 (18%), 29 (38%), 15 (19%), 18 (23%), and 1 (1%), respectively. At PACF admission, 70 (88%) were
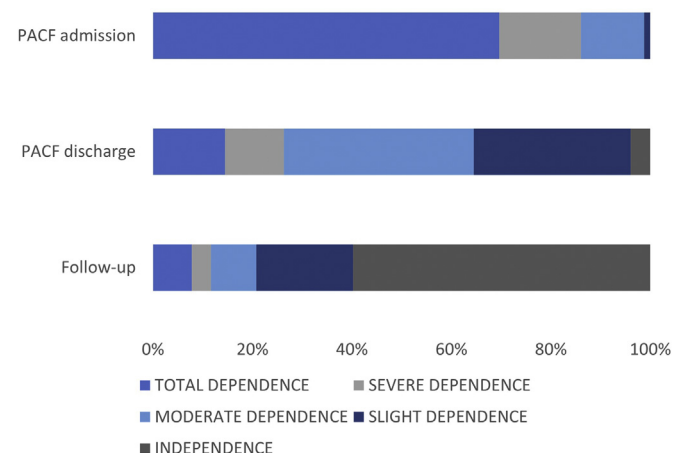

Fig. 1. Functional status, as measured by the modified Barthel Index (MBI) at post-acute care facility (PACF) admission, discharge, and after follow-up (*P* < .001). The MBI was categorized as total dependence if equal to 20; severe dependence, if between 21 and 60; moderate dependence, if between 61 and 90; mild dependence, if between 91 and 99; independence, if equal to 100.[5]

totally or severely dependent, whereas at discharge and follow-up 21 (26%) and 10 (12%) remained totally or severely dependent (P < .001), respectively (Figure 1).

Overall, in this cohort of relatively young and previously fit patients admitted to PACF after severe COVID-19, functional status was severely impaired at PACF admission, improved at discharge, and was sustained during follow-up, but there was a high burden of symptoms and perceived lower quality of life among survivors.

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SARS-CoV-2 B 1.1.7 Variant Outbreak in a Fully Vaccinated Nursing Home—Madrid, June 2021

To the Editor:

After mass vaccination against SARS-CoV-2, starting in December 2020, of residents in nursing homes (NHs), a sharp decrease in the number of outbreaks and mortality was observed.[1,2] Current evidence seems to support that the clinical benefits found for COVID-19 vaccines in clinical trials[3] may extend to long-term care residents.[4] However, some SARS-CoV-2 outbreaks after vaccination have been reported in nursing homes in the United States and in Canada.[5—7]

A recent SARS-CoV-2 outbreak caused by the B.1.1.7 variant occurred in an assisted nursing home in Madrid, Spain, in May-June 2021 some months after almost full vaccination of residents and staff (2 doses of Pfizer-BioNTech mRNA vaccine administered on January 15 and February 5, 2021) that was followed by regular vaccination of new residents and new staff. This facility had 170 residents distributed in 4 floors, with 24 hours' medical and nursing care. Two pre-vaccination COVID-19 outbreaks in August 2020 (17 cases, 10 hospitalizations, and 5 deaths) and in September 2020 (26 cases and 8 hospitalizations) were documented in this NH. SARS-CoV-2 serologic tests had been obtained from residents in August[8] and in December 2020.

The first 2 cases of this postvaccination outbreak [cases were defined either by a positive SARS-CoV-2 rapid antigen test or a reverse transcriptase polymerase chain reaction (RT-PCR) test] were identified at the emergency department (ED) of the reference hospital on May 30, 2021. These 2 patients had been transferred to the hospital ED owing to suspected hip fracture and aspiration pneumonia. A positive COVID-19 RT-PCR test was found in both during routine preadmission screening. The common rooms of the second floor of the NH where both residents lived was shared daily by 45 other residents, who had no contact with other residents outside this floor owing to functional disability.

Following local protocols, these 45 older adults and the 16 health care providers who cared for them were tested on May 31 with rapid antigen tests. These were positive in 12 residents and negative in 33 residents and all health care providers, in contrast with similar reported COVID-19 outbreaks.[6,7,9] All 45 exposed residents were immediately isolated and, on June 1, RT-PCR tests were performed by the hospital Microbiology Department, detecting 8 new cases, summing up to 22 infected residents (46.8% of those living in the same area of the NH). This outbreak infection rate was higher than that reported in other recent outbreaks.[5—7] Complete vaccination status was confirmed in all but 1 of the 47 residents (97.8%) with different vaccine batches.

Since the beginning of the outbreak, there was daily communication and coordination regarding infection prevention strategies among the NH staff, the regional public health office, the public primary care center the NH was affiliated to, and the microbiology and geriatric departments of the reference hospital. This was deemed crucial to quickly detect all infected residents and to avoid extension of the outbreak to the 123 residents allocated in other areas of the NH or to other NH staff.

The 25 exposed residents remained asymptomatic and with negative antigen tests during follow-up; 6 of them had a history of prior COVID-19 in 2020. Among the 22 cases, 12 were referred to the ED because of clinical deterioration and admitted for acute care in the COVID-19 area (median length of stay of 7 days). Of those admitted, 10 had respiratory failure and 9 pneumonia or other clinical complications. Three patients with advanced dementia and other complications (aspiration pneumonia or diarrhea by *Clostridioides difficile*) died in hospital. The outbreak mortality rate (14% among cases, 25% among hospitalized cases) was lower than the mortality found during the August 2020 outbreak (29% and 50%).

SARS-CoV-2 variants were assessed in all cases based on the detection of 2 single-nucleotide polymorphisms; whole genome sequencing (WGS) was done in 5 cases, all confirming the presence of the B.1.1.7 lineage, dominant in Spain at the time of the outbreak (results uploaded to the public GISAID database, access numbers 2558024, 2558025, 2558026, 2558033, and 2558034). The immune status of 46 residents was assessed on June 2, 2021: anti-spike IgG was present in 43 and nonreactive IgG in 3. This supports an adequate humoral immune response after vaccination, not described in previous reports, but also confirms the vulnerability of vaccinated seropositive NH residents.

No new COVID-19 cases were detected since June 2, so restrictive measures were gradually lifted based on regular PCR tests (Figure 1), so the outbreak was declared closed after 2 weeks (a shorter duration than COVID-19 outbreaks in the United States[9]), amid infection control measures implemented by the different stakeholders.

This report highlights the importance of early detection of COVID-19 outbreaks in NH, even in fully vaccinated settings, and the relevance of infection control measures and coordination