

## LETTER TO THE EDITOR

# Functional outcomes in elderly patients with hospitalized COVID-19 pneumonia: A 1 year follow-up study

Dear Editor,

Because super aging is progressing in Japan, society with extended healthy life expectancy is required. Basic activities of daily living (ADL) in the elderly are affected by pneumonia in the elderly [1]. Thus, the Japan Respiratory Society (JRS) pneumonia guidelines emphasize the importance of pneumonia prevention rather than antibiotic therapy to avoid deterioration of physical function [2]. The objective of this study was to clarify the functional outcomes at 1 year after hospital discharge in elderly patients ( $\geq 65$  years old) hospitalized for COVID-19 pneumonia.

The present study was conducted at five institutions between February 2020 and June 2021. The ADL assessment for calculating the Barthel index consisted of the following 10 indices: feeding, bathing, grooming, dressing, bowels, bladder, toilet use, transfers, morbidity, and stairs [3]. In the present study, we calculated the difference in ADL scores between baseline (1 week before admission), at hospital discharge, and 1 year after discharge from our hospitals. The difference was categorized into two groups: declined ( $\geq 1$ ) and not declined (0). Of the pneumonia cases, we excluded bedridden cases because these patients were not able to change their ADL score between before and after admission to hospital.

During the study period, 438 elderly patients with COVID-19 pneumonia were recognized. Table 1 shows the outcomes of

patients with COVID-19 pneumonia stratified by the three age groups. Functional decline rates at the time of hospital discharge and at 1 year after hospital discharge were highest in the  $\geq 80$  years old group (51.7% and 42.5%, respectively), followed by the 70–79 years old group (39.7% and 11.0%, respectively) and the 65–69 years old group (18.3% and 0%, respectively). Of 62 patients in the  $\geq 80$  years old group who had a decline in physical function at the time of hospital discharge, 51 patients (82.3%) still showed functional decline at 1 year later. In contrast, no patients with functional decline were observed at 1 year after hospital discharge in the 65–69 years old group.

In multivariate analysis, age (per year) (odds ratio [OR] 1.05, 95% confidence interval [CI] 1.02–1.07,  $p < 0.0001$ ), chronic heart disease (OR 1.91, 95% CI 1.04–3.23,  $p = 0.0376$ ), cerebrovascular disease (OR 1.66, 95% CI 1.05–2.79,  $p = 0.0125$ ), and diabetes mellitus (OR 2.19, 95% CI 1.06–3.93,  $p = 0.0335$ ) were risk factors for functional decline at 1 year after hospital discharge in elderly patients with COVID-19 pneumonia.

It is well known that hospital admission in elderly patients is associated with a decline in physical function, and functional decline after hospitalization is associated with adverse health outcomes. Recently, a Canadian longitudinal study found that community-living middle-aged and older adults with confirmed, probable, or suspected COVID-

**TABLE 1** Clinical characteristics and outcomes of elderly patients with COVID-19 pneumonia divided by age groups

Variables	65–69 years	70–79 years	$\geq 80$ years	<i>p</i> value*	<i>p</i> value**
No. of patients	109	209	120		
Median age (IQR), years	67 (66–68)	74 (72–77)	84 (81–86)	<0.0001	<0.0001
No. of males/females	76/33	143/66	62/58	0.8986	0.0068
No. (%) of patients with deterioration of physical activity					
At hospital discharge	20 (18.3)	83 (39.7)	62 (51.7)	<0.0001	<0.0001
At 1 year after hospital discharge	0	23 (11.0)	51 (42.5)	<0.0001	<0.0001
Barthel index (average)					
Before admission to hospitals	93	89	61	0.1205	<0.0001
At hospital discharge	52	40	14	<0.0001	<0.0001
At 1 year after hospital discharge	93	79	24	<0.0001	<0.0001
No. (%) of patients with in-hospital mortality	8 (7.3)	15 (7.2)	22 (18.3)	>0.9999	0.0179

Note: Continuous values are presented as medians and interquartile ranges (IQRs) and categorical/binary values as counts and percentages.

\*65–69 years old group versus 70–79 years old group.

\*\*65–69 years old versus 70–79 years old group.

19 had nearly twofold higher odds of worsening mobility and physical function compared with adults without COVID-19, although most participants with COVID-19 had mild to moderate disease and were not hospitalized [4].

Our present study focused on hospitalized elderly patients with COVID-19 pneumonia and demonstrated that 37.7% and 16.9% of patients showed a decline in function at the time of hospital discharge and at 1 year after hospital discharge, respectively, compared with their baseline ADL function. Functional decline rates were significantly higher in the older age group. Especially in the  $\geq 80$  years old group, 62 patients showed a decline in function at the time of hospital discharge and 51 patients (82.3%) still showed the functional decline at 1 year later.

Advanced age and medical comorbidities have been associated with severe illness associated with infection resulting in hospitalization, admission to an intensive care unit, intubation or mechanical ventilation, or death [5–7]. Our results demonstrated that more advanced ages, chronic heart disease, cerebrovascular disease, and diabetes mellitus were risk factors for functional decline at 1 year later in hospitalized elderly patients with COVID-19 pneumonia. Physicians should recommend the SARS-CoV-2 vaccination and the positively use anti-SARS-CoV-2 drugs when COVID-19 is found in patients who are  $\geq 80$  years old or who have comorbidities in elderly.

## KEYWORDS

activity of daily living, COVID-19, functional outcome, SARS-CoV-2

## CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

## AUTHOR CONTRIBUTIONS

**Naoyuki Miyashita:** Conceptualization; data curation; formal analysis; investigation; methodology. **Yasushi Nakamori:** Conceptualization; data curation; investigation; methodology. **Makoto Ogata:** Conceptualization; data curation. **Naoki Fukuda:** Conceptualization; data curation. **Akihisa Yamura:** Conceptualization; data curation.

## PEER REVIEW

The peer review history for this article is available at <https://publons.com/publon/10.1111/irv.13033>.

## DATA AVAILABILITY STATEMENT

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

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