

Trajectories of Neurologic Recovery 12 Months After Hospitalization for COVID-19

A Prospective Longitudinal Study

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Study Question

What are the trajectories of recovery of functional, cognitive, and quality of life metrics 12 months after hospitalization for COVID-19?

What Is Known and What This Paper Adds

Few data are available regarding long-term recovery following hospitalization for COVID-19. In this study, we found that 87% of patients had ongoing abnormalities in at least 1 quantitative metric 12 months after hospitalization for COVID-19; however, a significant proportion of patients made improvements in cognitive and anxiety scores between 6 and 12 months follow-up. Only fatigue metrics differed between those with and without neurologic events during index hospitalization.

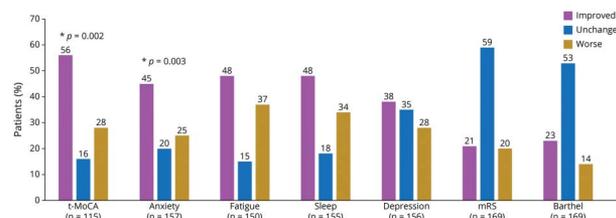
Methods

In this prospective, longitudinal study, follow-up interviews were conducted at 6 and 12 months for patients with and without a new neurologic event diagnosed during index COVID-19 hospitalization (between March and May, 2020). The primary 12-month outcome was the modified Rankin Scale (mRS) score comparing patients with or without neurologic complications using multivariable ordinal logistic regression analysis. Secondary outcomes included activities of daily living (Barthel Index); telephone Montreal Cognitive Assessment (t-MoCA); Neuro-QoL batteries for anxiety, depression, and fatigue; and sleep T scores compared between those with or without neurologic disorders using Mann-Whitney *U* and χ^2 tests. Changes in outcome scores from 6 to 12 months were compared using nonparametric paired-samples sign test.

Results and Study Limitations

Twelve-month follow-up was completed in 242 patients (median age 65 years, 64% male, 34% intubated during hospitalization) and 174 completed both 6- and 12-month follow-up. At 12 months, 197/227 (87%) had ≥ 1 abnormal metric: mRS >0 (75%), Barthel <100 (64%), t-MoCA ≤ 18

Figure Trajectories of Outcome Scores



Percent of patients with improved, unchanged, or worse outcome scores between 6 and 12 months post-COVID-19 hospitalization (n = 174).

(50%), high anxiety (7%), depression (4%), fatigue (9%), or poor sleep (10%). The 12-month mRS scores did not differ significantly among those with (n = 113) or without (n = 129) neurologic complications during hospitalization after adjusting for age, sex, race, pre-COVID-19 mRS, and intubation status (adjusted odds ratio 1.4, 95% CI 0.8–2.5), although those with neurologic complications had higher fatigue scores (T score 47 vs 44, $p = 0.037$). Significant improvements in outcome trajectories from 6 to 12 months were observed in t-MoCA scores (56% improved, median difference 1 point, $p = 0.002$) and Neuro-QoL anxiety scores (45% improved, $p = 0.003$). Nonsignificant improvements occurred in fatigue, sleep, and depression scores in 48%, 48%, and 38% of patients, respectively. Barthel and mRS scores remained unchanged between 6 and 12 months in $>50\%$ of patients. This study is limited in that results may not be generalizable to patients with mild or moderate COVID-19, as only severe cases were included.

Study Funding and Competing Interests

There are no direct funding sources for this study. The authors report no competing interests. Go to [Neurology.org/N](https://www.neurology.org/N) for full disclosures.

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