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BIOMARKERS

POSTER PRESENTATION

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Neurochemical signs of astrocytic and neuronal injury in acute COVID-19 normalizes during long-term follow-up

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Abstract

Background: Neurologic manifestations are well-recognized features of coronavirus disease 2019 (COVID-19). However, the longitudinal association of biomarkers reflecting CNS impact and neurological symptoms is not known. We wished to determine whether plasma biomarkers of CNS injury were associated with neurologic sequelae after COVID-19.

Method: Patients with confirmed acute COVID-19 were studied prospectively. Neurological symptoms were recorded during the acute phase of the disease and at six months follow-up, and blood samples were collected longitudinally. Healthy age-matched individuals were included as controls. We analyzed plasma concentrations of neurofilament light-chain (NfL), glial fibrillary acidic protein (GFAp), and growth differentiation factor 15 (GDF-15).

Result: We recruited 100 patients with mild (n = 24), moderate (n = 28), and severe (n = 48) COVID-19 who were followed for a median of (IQR) 225 (187–262) days. In the acute phase, patients with severe COVID-19 had higher concentrations of NfL than all other groups (all $p < 0.001$) and higher GFAp than controls ($p < 0.001$). GFAp was also significantly increased in moderate disease ($p < 0.05$) compared with controls. NfL ($r = 0.53$, $p < 0.001$) and GFAp ($r = 0.39$, $p < 0.001$) correlated with GDF-15 during the acute phase. After six months, NfL and GFAp concentrations had normalized, with no persisting group differences. Despite this, 50 patients reported persistent neurological symptoms, most commonly included fatigue (n = 40), "brain-fog" (n = 29), and changes in cognition (n = 25). We found no relation between persistent neurological symptoms and CNS injury biomarkers in the acute phase.

Conclusion: The normalization of CNS injury biomarkers in all individuals, regardless of previous disease severity or persisting neurological symptoms, indicate that post-acute COVID-19 neurological sequelae are not accompanied by ongoing CNS injury. Although injury biomarkers commonly increase in severe acute COVID-19, further investigations into the causes of post-infectious sequelae are needed.

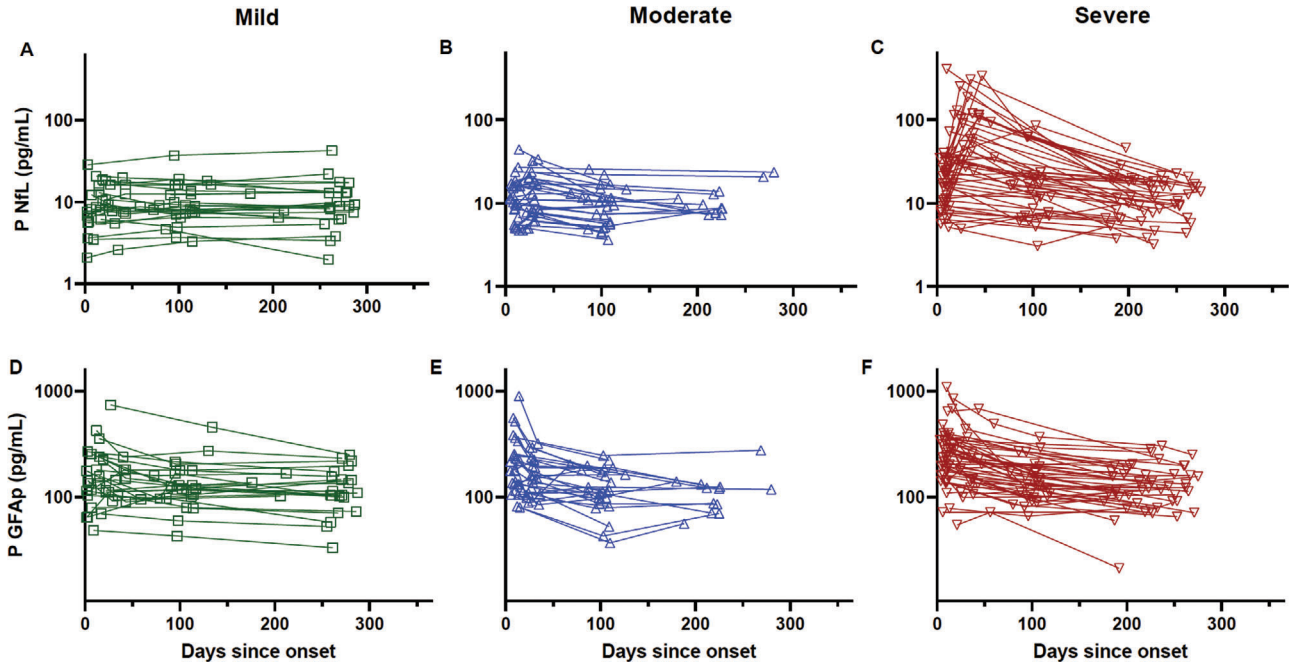
Mild
Moderate
Severe
A
B
C
D
E
F
P NfL (pg/mL)
P GFAp (pg/mL)
1
10
100
1000
0
100
200
300
Days since onset

FIGURE 1