Neurocognitive and psychological profile of a 57-year-old long-COVID patient after 42 days on a ventilator

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Introduction:

- Sars-Cov-2 (COVID-19) is a highly contagious disease that can result in mild to severe illness.
- COVID-19 has been shown to impact the brain through primary and secondary means.
- Severe illness has been linked to several cognitive complaints.
- Cognitive deficits have been found in the areas of attention, processing speed, executive functioning, memory, working memory, and word finding.
- Documented psychological changes include depression, anxiety, and post-traumatic stress.

Objective:

To analyze the neurocognitive and psychological profile of a COVID-19 patient after being hospitalized (March 2020) and on a ventilator for 42 days. Hospital course was notable for hypertension, acute kidney failure, and pressure ulcers.

Methods:

Procedure: Relevant data were collected via clinical interview, neuropsychological testing, and medical record review. Feedback was later provided to patient.

Imaging and physiological studies: Computerized tomography revealed mild cortical atrophy, while electroencephalogram found mild to moderate generalized slowing. No follow up studies have been performed.

Cognitive and Psychological Complaints: Around 15 months post-discharge, subjective cognitive complaints during the evaluation included mental "fogginess", increased impulsivity, decreased frustration tolerance, forgetfulness, fatigue, mobility difficulties, and dyspnea upon exertion. Psychologically, the patient reported increased anger, irritability, emotional lability, depression, "paranoia," and nervousness.

Results:

- Baseline functioning was estimated to be in the average range
- Patient reported independent ADLs, although shortness of breath and fatigue impacted completion. Wife assists with IADLs including medication management, finances, and complex decision-making. He drives, but reported not feeling confident. He no longer works (previously a mail-carrier and security guard).
- In comparison to baseline functioning, there was decline found in the following areas: motor functioning, confrontation naming, phonemic fluency, planning/organization, visual memory, and aspects of verbal memory (many intrusion errors and false positives).
- Behavioral observations
  - Disinhibited, impulsive, and labile.
- Emotional Functioning
  - Clinically elevated depression, anxiety, and post-traumatic stress.
- Sleep Functioning
  - Poor sleep quality, including insomnia and nightmares

Conclusions:

- Overall, findings suggest bilateral frontal and temporal dysfunction rather than subcortical deficits from hypoxemia.
- Similar to post-intensive care syndrome, the etiology of functional impairment in severely ill, hospitalized COVID-19 patients appears multifactorial. In this case study, there is likely a contribution from the illness itself (hypoxemia, cytokine storm), associated complications (acute kidney injury, hypertension), intervention methods (prolonged ventilation, sedation), and psychological distress.
- Future research should investigate the extent to which neurocognitive and psychological symptoms associated with long-COVID after hospitalization change as length of time since hospitalization increases.

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