Acute Objective Severity of COVID-19 Infection and Psychiatric Disorders 4 Months After Hospitalization for COVID-19

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Although psychiatric disorders are frequent after acute COVID-19, it is unclear whether they are predicted by acute COVID-19 severity. Indeed, a study based on electronic health records suggests a slight association between hospitalization or intensive care unit (ICU) admission during acute COVID-19 and incidence and prevalence of psychiatric disorders 6 months later.[1]

The objective of the present study was to assess whether a higher acute objective severity of COVID-19 infection predicted a higher prevalence of psychiatric disorders 4 months after hospitalization for COVID-19.

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J Clin Psychiatry 2022;83(1):21br14179

To cite: Gasnier M, Choucha W, Radiguer F, et al. Acute objective severity of COVID-19 infection and psychiatric disorders 4 months after hospitalization for COVID-19. *J Clin Psychiatry*. 2022;83(1):21br14179.

To share: https://doi.org/10.4088/JCP.21br14179

Methods

The COMEBAC (Consultation Multi-Expertise de Bicêtre Après COVID-19) cohort[2] included 478 patients admitted to the Bicêtre Hospital (Le Kremlin-Bicêtre, France) from March 1 to May 29, 2020, for acute COVID-19. Four months after discharge from the hospital, the patients were contacted by a medical officer by telephone. Patients provided written informed consent, and the Ethics Committee of the French Intensive Care Society (CE20-56) approved the study. Study eligibility criteria have been previously reported.[2] Among the 278 eligible patients, 177 (63.7%) engaged in a standardized psychiatric assessment in an outpatient setting. COVID-19 objective severity during hospitalization was assessed retrospectively using chart data. *DSM-5* psychiatric disorders were assessed 4 months after discharge by qualified psychiatrists using the Mini-International Neuropsychiatric Interview (MINI).[3] History of psychiatric disorders was extracted from medical records. Current psychiatric disorders, new-onset psychiatric disorders, and significant suicide risk were assessed during the psychiatric interview.

Statistical analyses were based on bivariate analyses (χ^2 tests or Fisher tests for qualitative variables and Student *t* tests or Wilcoxon tests for quantitative variables) and compared acute COVID-19 objective severity in patients with and without psychiatric disorders. In case of significant results in bivariate analyses, multivariate logistic regressions adjusted for age, sex, and ICU admission were performed.

Results

The mean patient age was 57.5 years (SD = 13.2). Sixty-eight patients (38.4%) were women. During acute COVID-19, 97 patients (54.8%) were admitted to the ICU, 51 (28.8%) required invasive ventilation, 29 (16.4%) had acute delirium, and 40 (22.6%) received immunomodulatory treatments. The mean (SD) length of hospitalization was 22.0 (16.2) days, the maximum C-reactive protein (CRP) level was 147.9 (111.5) mg/L, and the maximum creatinine level was 127.6 (161.1) µmol/L.

Four months after acute COVID-19, 36 patients (20.3%) had at least 1 current psychiatric disorder, including 24

(13.6%) with a major depressive episode and 20 (11.3%) with an anxiety disorder. Twenty-nine (80.1%) of these 36 patients were diagnosed with a new-onset psychiatric disorder. Nine patients (5.1%) had a significant suicide risk.

Psychiatric disorders, new-onset psychiatric disorders, and significant suicide risk 4 months after acute COVID-19 were not associated with higher acute COVID-19 severity, as assessed with length of hospitalization, ICU admission, invasive ventilation, acute delirium, use of immunomodulatory treatments, maximum CRP levels, and creatinine levels. Based on a Cohen $d > 0.50$ for quantitative variables and $w > 0.30$ for qualitative variables, the identification of variables associated with new-onset psychiatric disorders had an a posteriori power of 75% for quantitative variables and 87% for qualitative variables.

Discussion

In this sample of survivors after hospitalization for acute COVID-19, we failed to show any association between acute COVID-19 objective severity and psychiatric disorders 4 months later. This result is in line with findings from 2 previous studies[4,5] focusing on anxiety and depressive symptoms 4 and 6 weeks after hospitalization for COVID-19 in 200 and 81 patients, respectively. Similarly, a recent report[5] in a sample of 58 patients found no association between CRP during acute COVID-19 and anxiety and depressive symptoms 3 months later. Accordingly, a study[6] in 75 patients showed no association between mechanical ventilation during acute COVID-19 and depressive symptoms 5 months after discharge. However, the absence of association between acute COVID-19 objective severity and psychiatric disorders after discharge may be limited to hospitalized patients, since Taquet et al[1] have shown differences between hospitalized and non-hospitalized patients. Moreover, the average age of COMEBAC patients was high, and neuropsychological aftereffects of COVID-19 might differ in a younger cohort and might have influenced the lack of association between COVID-19 severity and psychiatric disorders.

Nonetheless, our data may suggest that the mechanisms underpinning psychiatric disorders are not those provoking severe acute COVID-19, such as acute inflammation[7] and coagulopathy.[8] They also suggest that the relevance of individual susceptibility factors to psychological stress and the context of the pandemic may trigger the onset of psychiatric disorders.

Even if the sample size is moderate, the dropout rate is high (psychiatric characteristics being potentially different between patients who dropped out and those who did not), and psychiatric assessments before acute COVID-19 are lacking, our study not only provides a precise clinical, prospective, and biological characterization of patients during hospitalization for acute COVID-19 but also characterizes patients through the use of standardized psychiatric assessments by senior psychiatrists 4 months later.

Given their independence from objective severity of acute COVID-19 and the large number of survivors after hospitalization for COVID-19, psychiatric disorders after acute COVID-19 are a relevant public health problem in terms of incidence and treatment needs. Assessment of psychiatric disorders should be proposed to patients after hospitalization for COVID-19. Additionally, research is needed about the underpinning mechanisms and potential treatments of psychiatric disorders after COVID-19.

Published online: November 23, 2021.

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Potential conflicts of interest: **Dr Noel** reported personal fees from MSD and Biogen outside the submitted work. **Dr Montani** reported personal fees from Actelion, GSK, Pfizer, MSD, Chiesi, Boehringer, and Incyte Biosciences France; grants from Bayer and MSD; and nonfinancial support from Acceleron outside the submitted work. **Dr Monnet** reported personal fees from Getinge Pulsion Medical and Baxter outside the submitted work. **Dr Becquemont** reported grants from Sanofi Genzyme for a presentation concerning Gaucher disease and pharmacogenetics and drug interactions with Eliglustat outside the submitted work. The other authors reported no disclosures.

Funding/support: This study was funded by the Assistance Publique-Hôpitaux de Paris (APHP).

Role of the sponsor: The funder was not involved in the design and conduct of the study, collection, management, analysis, and interpretation of the data, preparation, review, or approval of the manuscript, nor the decision to submit the manuscript for publication.

Acknowledgments: The authors thank the patients who participated in this cohort, as well as the doctors, psychologists, nurses, care helpers, biologists, pharmacists, other allied health professionals, and administrators of Bicêtre Hospital and the APHP. They thank Kenneth Chappell, MSc, for language editing. Mr Chappell received no financial compensation for this work.

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