

Neurological Associations Among COVID-19 Patients: A Systematic Review and Meta-Analysis

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Abstract: Background The global threat of COVID-19 caused by the SARS-CoV-2 virus has reached a high level and the outbreak has been declared as a pandemic. This disease affects different organs and systems including the central nervous system. In this study, we aimed to clarify the development of neurological complications in patients with COVID-19 and the factors associated with these conditions. Methodology Two authors independently searched the Cochrane, Trip, EMBASE, and Google Scholar databases from January 2020 to February 2021. The literature search included studies written in English and related to neurological complications in COVID-19 patients. Then, the two authors independently determined the characteristics and risk of bias of the included studies. Finally, we analyzed the data using odds ratios (ORs) or mean differences (MDs) and 95% confidence intervals (CIs). Results This review involved 4401 patients with COVID-19 from six observational studies. Overall, low to moderate heterogeneity was recorded among the included studies. A high risk of bias was not detected in any of the domains studied, although there were some low risks of bias and heterogeneity. Of the included patients, 8.24% developed neurological manifestations, including delirium (84.3%), myalgia (44.8%), headache (37.7%), encephalopathy (31.8%), dizziness (29.7%), dysgeusia (15.9%), anosmia (11.45%), acute ischemic stroke (4.6%), cerebrovascular disease (1.78%), and intracerebral hemorrhage (0.5%). The severity of COVID-19 and the association of underlying comorbidity (predominantly hypertension) increased the risk of neurological complications among COVID-19 patients by fourfold (OR 4.30, CI 2.54–7.29 and OR 4.01, CI 1.05–15.36, respectively). Patients with heart diseases, diabetes, and dyslipidemia had a twofold higher risk of developing neurological complications (OR 2.53, CI 1.01–6.33; OR 2.31, CI 1.15–4.65; and OR 2.13, CI 1.52–3.00, respectively). Conclusion Our analysis indicated that neurological complications were uncommon in patients with COVID-19. Age, male sex, smoking, the severity of disease, and underlying comorbidity, including hypertension, heart disease, diabetes, and dyslipidemia, were identified as significant risk factors for neurological complications in COVID-19 patients. Keywords Neurological complications · COVID-19 · Risk factors · Cerebrovascular complications