INPLASY

Blood biomarkers as prognostic indicators for neurological injury in COVID-19 patients: A systematic review and meta-analysis

INPLASY202390063
doi: 10.37766/inplasy2023.9.0063
Received: 20 September 2023
Published: 20 September 2023

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ADMINISTRATIVE INFORMATION

Support - This study is funded by the Health and Medical Research Fund Commissioned Research on COVID-19 (COVID1903007), and internal funding for Research Institute (RiFood, 1-CD55).

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202390063

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 20 September 2023 and was last updated on 20 September 2023.

INTRODUCTION

Review question / Objective Aiming to determine the level of GFAP and NfL between COVID-19 patients and healthy controls, generating evidence about the association between neurological injury-related biomarkers and COVID-19 prognosis.

Condition being studied Neurological injury in COVID-19 patients. Coronavirus disease 2019 (COVID-19) is a respiratory illness caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). These patients will also manifest include fatigue, headache, vision impairment, neuropsychiatric symptoms, encephalopathy, peripheral neuropathy, stroke, seizures, and cerebrovascular disease.

METHODS

Search strategy Searching multiple electronic databases, including PubMed, Web of Science, Scopus, EMBASE, Google Scholar, and MedRxiv.

Participant or population COVID-19 patients and healthy controls.

Intervention We compare the patient with healthy controls.

Comparator Healthy controls.

Study designs to be included case-control, cohort, and cross-sectional study designs.

Eligibility criteria The eligibility criteria also included studies that reported the outcome of

interest (NfL and GFAP)and expressed the results for both COVID-19 patients and healthy controls.

Information sources PubMed, Web of Science, Scopus, EMBASE, Google Scholar, and MedRxiv.

Main outcome(s) The pooled standardized mean differences (SMD) of GFAP and NfL between COVID-19 patients and healthy controls.

Additional outcome(s) Analyze the relationship between the SMD and the severity and survival of COVID-19 patients.

Data management Two independent reviewers screened the publications and selected them according to inclusion criteria. We use Excel and Review Manager version 5.4 for data management and analysis.

Quality assessment / Risk of bias analysis We use the Newcastle-Ottawa Scale (NOS) for assessing the quality of studies.

Strategy of data synthesis The statistical analysis was conducted using Review Manager version 5.4. The SMD value with 95% CI of GFAP and NfL was analyzed for COVID-19 and healthy controls. Tables and forest plots were used to summarize and present the results. The random and fixed effects models pooled the SMD analysis of GFAP and NfL between COVID-19 and healthy controls with their respective 95% CIs. The I-square statistic was used to assess heterogeneity, and the funnel plot was used to evaluate publication bias. A P value ≤ 0.05 was considered statistically significant.

Subgroup analysis COVID-19 severity as the subgroup was the target of analysis, including mild, moderate, and severe COVID-19 patients.

Sensitivity analysis Different effect models: fixed effect model and random effect model were used.

Language restriction We included studies reported in English.

Country(ies) involved Hong Kong, China.

Keywords GFAP; NfL; meta-analysis; neurological biomarker; COVID-19.

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