

Positive cerebrospinal fluid RT-PCR tests of Covid-19 patients: A systematic review

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Introduction:

The respiratory manifestations of coronavirus disease 2019 (COVID-19) are well-reported, but recent evidence implicates the nervous system in the pathogenesis of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). This study aims to summarise the clinical characteristics associated with patients whose cerebrospinal fluid (CSF) tested positive for SARS-CoV-2, to provide clinicians with a better understanding of the neurological involvement of COVID-19 from a clinical and diagnostic perspective.

Methods:

A comprehensive search of PubMed, EMBASE, Scopus, WHO Coronavirus database, bioRxiv, medRxiv, and Web of Science databases was carried out. Original studies reporting positive RT-PCR SARS-CoV-2 tests on CSF samples were included. Key search terms encompassed all variations of "COVID-19" AND "cerebrospinal fluid".

Results:

525 studies were identified through the systematic search. 56 full-text articles were included and assessed for eligibility post abstract screening and deduplication, of which 13 were qualitatively analysed. A total of 14 patients were reported to test positive for SARS-CoV-2 in their CSF samples. In 21.4% (3/14) of cases, nasopharyngeal (NP) swabs tested negative despite a positive CSF sample. 14.2% (2/14) of positive cases as per NP swab tested negative after supposed recovery, but progressed to neurological deterioration and positive CSF tests. Most commonly reported symptoms included headache (6/14), fever (5/14), vomiting (4/14), cough (4/14), visual disturbances (4/14), diarrhea (3/14), and seizure (3/14). 28.6% (4/14) of patients were admitted to ICU, and 14.2% (2/14) expired.

Conclusion:

It is important to consider the neurological manifestations of COVID-19 even in the absence of a positive NP swab test. Additionally, SARS-CoV-2 RT-PCR tests of CSF samples may prove to be a beneficial diagnostic modality in the case of COVID-19 nervous system involvement. In order to establish informed guidelines, further evidence is needed to understand the clinical implications of CSF tests in COVID-19 patients.