Immunophenotypic characterization in CSF of patients with virus-associated neuroinflammatory diseases

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Background:
Acute and chronic viral infection may cause immunological alterations such as chronic activation, immunodeficiency and infiltration of inflammatory cells into the central nervous system (CNS) that underlie the pathogenesis of neurologic disorders. In the ongoing pandemic of a novel coronavirus SARS-CoV-2, neurologic manifestations associated with coronavirus disease 2019 (COVID-19) have emerged such as headache, loss of smell, myalgia and fatigue.

Methods:
To understand virus-associated immune signatures in the CNS of patients with neurologic diseases, we examined the immunophenotypes in CSF cells of subjects with viral infection and/or neuroinflammatory diseases including HTLV-1-associated myelopathy/tropical spastic paraparesis (HAM/TSP), multiple sclerosis (MS), progressive multifocal leukoencephalopathy (PML), and post-COVID-19 neurologic syndrome (post-COVID), compared to healthy normal donors (ND).

Results:
The subjects with chronic viral infection, such as HAM/TSP and PML patients, showed characteristic signatures of T cell subsets and expressions of multiple immune checkpoint molecules, PD-1, CD244, TIGIT, and CD226, in CSF compared to NDs, while the patients with post-COVID did not. Antibody secreting B cells were elevated in the CSF of patients with viral infection (HAM/TSP, PML, and post-COVID) as well as MS patients. Elevated $CD56^{bright}$ NK cells in the CSF were also detected in a subset of patients with neurologic diseases. In addition, PD-L1 was highly expressed on CSF monocytes of patients with HAM/TSP and a subset of patients with MS, PML and post-COVID, compared to NDs.

Conclusion:
These results highlight the importance of immune regulation in CSF cells and the associated inflammatory milieu in subjects with virus-associated

neuroinflammation and may provide new insight into immune microenvironment and rationale for targeting immunotherapy.

Disclosure of Interest Statement:
Nothing to disclose.