

COVID-19 in Neurology

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ROYAL COLLEGE OF
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Outline

- Review of recent publications regarding neurological manifestations of COVID-19
- Impact of COVID-19 on acute neurology service

Neurological Associations of COVID-19

- Lessons from previous coronavirus:
 - SARS-CoV 2002 – CNS (encephalopathy +/- seizures) + PNS (motor neuropathy, myopathy). Reports of positive viral PCR in CSF
 - MERS-CoV 2012 – CNS (encephalopathy, strokes) + PNS (Guillain Barre syndrome (GBS), sensory neuropathy). No reports of positive viral PCR in CSF

CNS = central nervous system

PNS = peripheral nervous system

CSF = cerebrospinal fluid

Neurological Associations of COVID-19: Case Reports

Category	Presentation
Encephalopathy	Dizziness, headache, impaired consciousness
Encephalitis	Fever, headache, confusion, seizures Lymphocytic pleocytosis
Cerebrovascular disease	Can precede respiratory symptoms Elevated D-Dimer suggesting prothrombotic state
Peripheral nerve disease	Hypo/anosmia and hypo/ageusia GBS – neurological symptoms preceding or shortly following respiratory symptoms

Rare reports of COVID-19 PCR positivity from CSF and post mortem tissues

Ellul M et al. The Lancet Neurology Pre-Proof April 2020

Neurological Associations of COVID-19: Case Reports

ANECDOTAL TOP NEUROLOGICAL PRESENTATIONS May 2020

Anosmia/Ageusia

Myalgia

Fatigue

Headaches

Sleep disorders

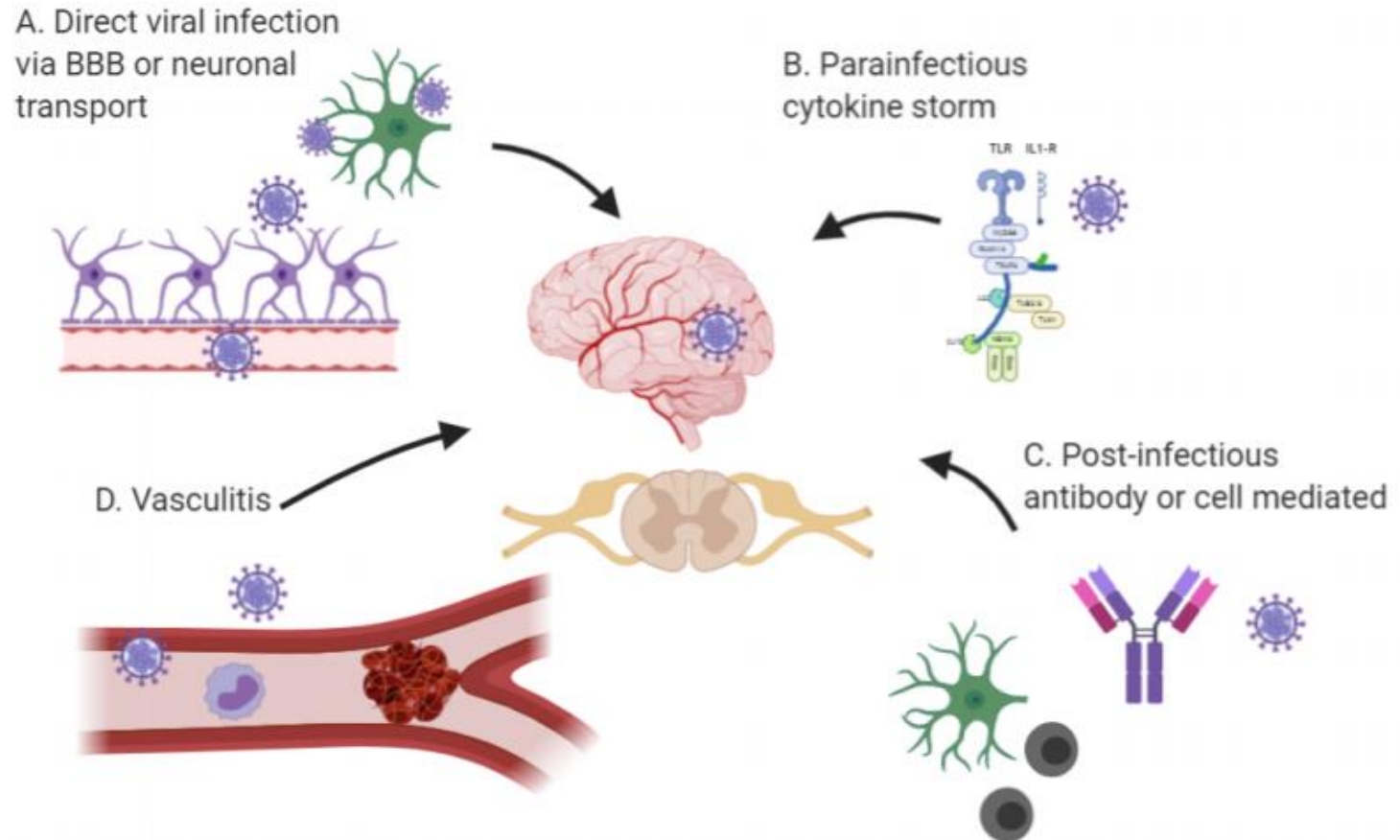
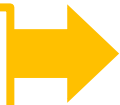
Possible Mechanisms of Action

NEUROTROPISM

Theoretical direct infection into CNS via olfactory nerve

ACE2 receptor found in olfactory pathways

Recent case report of supportive MRI imaging



Neurological Associations of COVID-19: Practical Messages and Caveats

- No clear correlation between COVID-19 infection and disease of the nervous system yet though neurological symptoms are common
- Important to differentiate between direct effects of virus and effects of systemic illness:
 - Hypoxia, sepsis, hypercoagulability cause neurological complications
 - Peripheral nerve disease may be related to critical illness in intensive care setting

Acute Neurology: Top Concerns

- Neurologists in UK guided by the Association of British Neurologists guidelines
 - Regularly amended as evidence grows
- Conditions of note:
 - Immunosuppression in neurological diseases
 - Encephalopathy/Seizures
 - Guillain Barre syndrome

Immunosuppression in Neurological Diseases

- Do not stop medications without neurology discussions
- Risk of relapse of disease
- Steroids:
 - Daily prednisolone dose $\geq 20\text{mg}$ – high risk, shield
 - Daily prednisolone dose $\geq 10\text{mg}$ + other immunosuppressant (eg. azathioprine/mycophenolate mofetil/methotrexate) – high risk, shield

Immunosuppression in Multiple Sclerosis

- Safety and risks of disease modifying drugs remain uncertain
- Monitoring of drug and disease activity may be affected

Low Risk	Moderate Risk	High Risk
Beta interferons Glatirimer acetate Teriflunamide Natalizumab	Fingolimod Ocrelizumab	Cladribine Alemtuzamab Haematopoietic stem cell transplant

Encephalopathy/Seizures

- Management in critical care setting where appropriate
- No change to anti-epileptic treatment recommendations
 - Some drugs may interact with drugs prescribed in drug trials:
<https://www.covid19-druginteractions.org/>

Guillain Barre Syndrome

- Early discussions with neurology (as usual)
- Consider COVID-19 testing
- No changes to treatment protocols – include IV Immunoglobulin and Plasma Exchange

Conclusions

- Evidence continues to emerge but currently no clear links between COVID-19 and specific neurological complications, although neurological symptoms are common
- Possible route of transmission is neurotropism via olfactory nerve – relates to anosmia
- Neurological disease in the context of COVID-19 infection should prompt discussion with neurology teams – especially in the context of immunosuppression

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 - Compiled evidence of neurological and neuropsychiatric manifestations and complications of COVID-19 by category, updated weekly
- Association of British Neurologists Guidelines: https://www.theabn.org/page/covid19_response