Neurological Issues, COVID-19, and TSC: What You Need to Know

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Severe Acute Respiratory syndrome coronavirus 2 (SARS-CoV-2)
Coronavirus disease 2019 (COVID-19)

• COVID-19 infection is typically spread from one person to another via respiratory droplets produced during coughing and sneezing.
• COVID-19 infection may occur by touching a surface or object that has the virus on it and then touching the mouth, nose, or possibly their eyes.
• Time from exposure to onset of symptoms is generally between 2 and 14 days, with an average of 5 days.
COVID-19

• Infection may be asymptomatic
• Many develop flu-like symptoms including:
  - fever
  - dry cough
  - shortness of breath
• Less commonly, patients will experience:
  - sneezing
  - runny nose
  - sore throat
• Gastrointestinal symptoms may include:
  - diarrhea
  - vomiting
Individuals at Risk for Severe COVID-19

• Older patients >age 60
• Underlying illness:
  - cardiovascular disease
  - lung disease
  - hypertension
  - liver disease
  - kidney disease
  - cancer
  - immunosuppression
• COVID-19 may also cause lasting damage to the lungs, heart, liver, kidneys
Primary Organ Systems Affected in TSC

- Brain and eyes
- Skin
- Heart
- Kidneys
- Lungs

Everolimus
Sirolimus
Common symptoms:
- Fever
- Dry cough
- Fatigue

Uncommon symptoms:
- Headache
- Nasal congestion
- Sore throat
- Coughing up sputum
- Shortness of breath
- Pain in muscles or joints
- Chills
- Nausea and/or vomiting
- Diarrhoea

In severe disease:
- High fever
- Coughing up blood
- Decreased white blood cells
- Kidney failure

- Much learned from experiences in: China, Italy, USA
- Loss of Taste and Smell
- Stroke
- Headache/Dizziness
- Altered mental status
- Peripheral neuropathy
- Weakness (deconditioning)
- Overall more common in severe infection -requiring hospitalization -but can be seen in mild COVID-19

Carod-Artal, 2020
Alterations in Taste and Smell in COVID-19

• Loss of taste sensation (ageusia) 12% - 71% -may be reduced sense of taste
• Loss of smell sensation (anosmia) 11% - 68% -may be reduced sense of smell
• May occur with no or mild symptoms
• Not due to nasal congestion
• Onset from 1-3 days prior to hospitalization
• Loss of smell sensation correlates with: -detection of SARS-CoV2 virus (positive test)
• Resolution of symptoms within days to weeks

Beltran, 2020; Mao, 2020; Yan, 2020
Headache and COVID-19

• Throbbing, pressure, aching
• Frontal, occipital, base of neck
• 12-40% of cases
• Severe > mild COVID-19
• Many also report feeling:
  - dizzy
  - nauseated
  - extreme fatigue

Li, 2020; Marcolin, 2020; Zhu, 2020
Altered mental status in COVID-19

• Lethargy, confusion, delerium
• Reduced level of consciousness, coma
• Seen in severe COVID-19
• May be due to:
  - SARS-CoV2 infection in brain
  - Circulating cytokines
  - Fever
  - Low blood oxygen levels
Stroke and COVID-19

• Incidence is not fully known (estimates 7-16%)
• Observed in severe cases with comorbidities: hypertension, diabetes, heart disease, and obesity, all risk factors for stroke
• Observed in young people < age 50: with no risk factors
• Symptoms of stroke: weakness (paralysis), loss of speech, loss of vision
• Occur within 1 day-2 weeks of COVID-19 symptoms

Lodigiani, 2020; Zhou, 2020
Stroke and COVID-19

• SARS-CoV2 may cause:
  - excessive clotting of blood
  - formation of small and large clots

• May be due to SARS-CoV2 effects on:
  - arteries in the brain
  - changes in blood flow to the brain

Hess, 2020
Seizures

• Incidental case reports in select patients
• Lu et al., 2020 (Wuhan experience)
  - no increased risk of seizures in COVID-19
• Possible worsening of seizures with:
  - fever
  - systemic illness, circulating cytokines
  - antibiotics
  - low blood oxygen levels
Peripheral Neuropathy

• Guillain-Barre syndrome in Italy (Ravaglia, 2020) - 6+ cases reported - inflammatory injury to peripheral nerves - motor movement - sensation

• GBS symptoms began 5-10 days after the first COVID-19 symptoms

• Three patients required mechanical ventilation.

• Most severe patients experience extreme fatigue - muscle aches due to direct muscle injury (rhabdomyolysis)

• Rare reports of ophthalmoparesis - weakness of eye muscles and double vision

• Long-term: deconditioning - weakness - neuro-rehabilitation requirement

Gutierrez-Ortiz, 2020
Questions about Neuro-COVID-19?

• Does SARS-CoV2 enter the brain?
• Does SARS-CoV2 infect nerve cells in the brain?
• Does SARS-CoV2 infect peripheral nerve cells?
• Is SARS-CoV2 detected in cerebrospinal fluid?
• Can SARS-CoV2 infection cause seizures?
Questions about Neuro-COVID-19 and TSC?

• Does TSC put me at greater risk for COVID-19?
• Does everolimus/sirolimus put me at greater risk for COVID-19?
• Should I keep taking everolimus/sirolimus for epilepsy or SEGA?
• Should I travel to doctor’s visits for TSC?
• What happens if I develop COVID-19?
• Can COVID-19 make my seizures worse?
• Will COVID-19 affect SEGA growth?
• Will COVID-19 affect autism?
QUESTIONS?

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