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Neuro-anesthesia in COVID-19 era!

Neuro Quiz # 62

Quiz Team
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START
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**Question 1:** DBS battery change

**Question 2:** Trans-sphenoid pituitary surgery

**Question 3:** Acute ischemic stroke

**Question 4:** Electro Convulsive Therapy

**Question 5:** Neurological manifestations of COVID

REFERENCES
A 65 kg, 75y M patient with a Deep Brain Stimulator for Parkinson’s Disease presents for battery change. Past medical history is significant for hypertension, smoking, asthma, and hyposmia. He traveled to New York 2 weeks ago. All the following are TRUE regarding questions and plans for the management of this patient EXCEPT:

A: I would inquire about recent cough, fever, and SOB

B: I would ask about his hyposmia

C: If the patient has had a negative RT-PCR test for Coronavirus, then it is safe to proceed without PPE’s

D: Even if this patient is presently PCR negative, has no symptoms of COVID-19, and normal chest imaging, an LMA may not be the best choice for airway management for this procedure.

Question contributed by M. Angele Theard
True, I would inquire about these symptoms which are commonly associated with COVID-19 as well as request that this elderly patient with multiple comorbidities, who is therefore at increased risk for complications from COVID-19 and who recently traveled to NY (hotspot) be tested for coronavirus. I would also obtain additional imaging like CXR/chest CT before proceeding with surgery.


True. While hyposmia may be a manifestation of this patient’s Parkinson’s disease, this could also be an indication of COVID-19.

In a retrospective case series of 214 patients hospitalized in Wuhan, China, 36.4% of patients had neurological symptoms. In addition to headache and dizziness, other common complaints were hypogeusia or reduced taste (5.6%) and hyposmia or reduced smell (5.1%). These neurological symptoms may reflect SARS-CoV-2’s ability to infect the CNS like SARS-CoV and MERSCoV, which have both been shown to infect the CNS in animal models.


Spinato G, Alterations in smell or taste in mildly symptomatic patients with SARS-CoV-2 infection. JAMA, published on line April 22, 2020. E1-E2
Great Job!!  Correct.

EXPLANATION

This is not true. Reverse transcription-polymerase chain reaction (RT-PCR) assays are used for detection of nucleic acid from the SARS-CoV-2 virus. It is unclear when this patient was tested for COVID. If his last test was before travel to NY, repeat testing is indicated. As false negatives do occur, even if this asymptomatic patient tests negative for Coronavirus, the ASA/APSF recommends that for aerosolized procedures like airway management, N-95, gloves, gown, and eye protection should still be warn.

While general anesthesia for DBS battery change is quite common, airway management in this patient merits caution. This patient’s recent travel to NY requires consideration with any type of airway management choice. Of the close to 850,000 positive COVID-19 cases in the US, 247,512 cases are in NY. Every 10 infected people in NY transmits the virus to another 9. With a continued shortage of PPEs, conserving PAPRs and N-95 for sick COVID-19 patients is a serious consideration.

Positive pressure ventilation with an LMA potentially generates aerosolized particles as the seal obtained is usually inferior to that achieved with a correctly placed endotracheal tube. Coughing on induction during placement of an Endotracheal tube and during emergence leads to aerosolized particles potentially infecting all operating room personnel. Therefore PPEs should be worn during general anesthesia with either LMA or ET tube placement or consideration of local anesthesia and MAC to conserve PPEs.

COVID cases in New York, April, 2020
Consensus statement: Safe Airway Society principles of airway management and tracheal intubation specific to the COVID-19 adult patient group, MJA, 2020
SNACC Consensus statement: Anesthetic Management of Endovascular Treatment of Acute Ischemic Stroke During COVID-19 Pandemic: Consensus Statement from SNACC
48 y/o patient is scheduled for trans-sphenoidal pituitary resection. He has a headache and a temp of 100.3 but no cough or breathlessness. COVID testing is pending. The surgery is deemed emergent as patient has altered mental status. All are TRUE about management of this patient, except:

A: Endoscopic surgeries are considered high risk for aerosol generation

B: All the personnel in the room should wear PPE

C: Should only be done in a positive pressure operating room

D: Preoperative decolonization may lessen the aerosolized burden

Question contributed by Suneeta Gollapudy
This is True. Possibly due to the high viral shedding from the nasal and oropharyngeal cavity. Hence elective surgeries are not encouraged during this pandemic.

This is True, because endonasal surgery creates clouds of droplets and aerosols which may permeate the operating environment, anyone in the operating theater requires N95/PAPR, gown, eye protection and double gloves.

Zara M Patel, MD, Juan Fernandez-Miranda, MD, Peter H Hwang, MD, Jayakar V Nayak, MD, PhD, Robert Dodd, MD, PhD, Hamed Sajjadi, MD, Robert K Jackler, MD, Letter: Precautions for Endoscopic Transnasal Skull Base Surgery During the COVID-19 Pandemic, Neurosurgery, , nyaa125, https://doi.org/10.1093/neuros/nyaa125
EXPLANATION

• This is false. Aerosol generating procedures should be done in negative pressure rooms in Covid positive patients. Emergency endonasal endoscopic surgeries are feasible since COVID-19 is still supposed to be containable when the surgeries are performed in negative pressure operating rooms with sufficient personal protective equipment and the patients are kept under quarantine postoperatively. Negative pressure rooms have minimum of 6 air changes per hour (12 air changes per hour are recommended for new construction or renovation). Air from these rooms should be exhausted directly to the outside or be filtered through a high-efficiency particulate air (HEPA) filter directly before recirculation.

This is True. Preoperative nasal povidone iodine and oral chlorhexidine gargle may lessen the viral load. Both agents have broad activity against bacteria and viruses that will serve to protect patients and providers from subsequent transmission. This approach (chlorhexidine wipes, nasal povidone iodine, and chlorhexidine oral rinse) can be applied after patient induction/stabilization for emergent procedures.
A 68 y/o F, with history of atrial fibrillation, hypertension and diabetes, now is scheduled for emergent left MCA thrombectomy for acute ischemic stroke (AIS). She is afebrile but has mild sore throat. No recent travel history. During the COVID-19 pandemic, which of the following anesthetic management of endovascular treatment (EVT) of AIS is NOT recommended by SNACC?

A. All COVID-19 positive or suspected positive patients require general anesthesia

B. Patients with posterior circulation or dominant cerebral hemisphere occlusions may be preferred candidates for general anesthesia

C. Lead apron should be worn prior to “donning” personal protective equipment

D. Transport for post-EVT imaging should be limited as much as possible

Question contributed by Hui Yang
Great Job!! Correct.

EXPLANATION

Not all COVID-19 positive / suspected positive patients require general anesthesia (GA) for EVT because:

• Most COVID-19 positive patients (including those not suffering from AIS) do NOT require intubation/mechanical ventilation unless they are in respiratory failure. Infection risk to healthcare personnel providing care to the patients who are stable and not intubated can be managed using personal protective equipment (PPE).

• Bag-mask ventilation, intubation, extubation and airway interventions result in aerosolization of respiratory secretions, thereby increasing the likelihood of exposure to the anesthesiologists and other personnel in the room. Airway interventions require airborne precaution including possible use of PAPR and hence, extra time which may delay puncture time and revascularization.


The following criteria may be used to identify patients who may be preferred candidates for GA during the COVID-19 pandemic:

a. Known/suspected COVID-19 positive patients with AIS who have:
   i. acute respiratory distress/hypoxemia/requiring high flow oxygen or
   ii. active cough or
   iii. inability to protect airway or
   iv. active vomiting
b. Posterior circulation/dominant cerebral hemisphere occlusions
c. Severe stroke (NIHSS >15) or GCS <9
d. Agitated/uncooperative patient/aphasic patients

Anesthesia providers must ensure that lead apron is donned before PPE to minimize the contamination of the lead apron. After the procedure, the lead suits worn during the procedure require rigorous decontamination with disinfection wipes containing a quaternary ammonium compound and alcohol. A top-down cleaning sequence may reduce bioburden. Locations for donning, doffing and cleaning of lead apron will need to be established in close proximity to the interventional suite, and appropriate PPE should be available in that location.
To minimize the risk of spreading viral infection through droplets, aerosols, or contaminated surfaces, transport for post-EVT imaging should be limited as much as possible. It is recommended that post-EVT imaging only be performed in the setting of concern for neurological compromise and to rule out hemorrhagic conversion if it cannot be done using a flat-panel CT in the IR suite. Patients receiving GA should remain intubated for imaging.

A 38 year old female needs an ECT due to severe depression. She became depressed after a recent travel. She does not have any respiratory symptoms. All the following are true regarding her management except:

A. If her SARS-COV2 is positive, she should not undergo ECT for 14 days and until she tests negative

B. Induction agents providing best possible quality of seizure should be employed

C. Positive pressure bag mask ventilation is recommended in a positive pressure operating room.

D. Consider anti-tussive strategies like IV remifentanil or IV lidocaine during emergence

Question contributed by Shobana Rajan
ECT should be done only if patient has severe depression or suicidal. Only those asymptomatic for COVID-19 disease should be considered for ECT, and each patient should be tested for SARS-CoV-2 virus close to the time of their procedure. SARS-CoV-2 positive patients should not be allowed to proceed with ECT. If asymptomatic, patients who test positive for SARS-CoV-2 but remain asymptomatic should be allowed to proceed only if subsequent testing 14 days later is negative, and ECT is considered a life-saving procedure.
Induction agents providing best possible quality of seizure should be employed; these include ketamine, etomidate and methohexital. This would avoid the need to bag mask and hyperventilate the patient.
EXPLANATION

• Although hyperventilation using bag-mask ventilation can improve seizure quality, aerosolization is increased with significant risk of infection for healthcare providers. Therefore, this strategy should be avoided during the COVID-19 pandemic unless adjustment to other measures to improve seizure quality is unsuccessful. ECT should preferably be done in a negative pressure room. Patients should be carefully preoxygenated prior to induction of anesthesia, bag mask ventilation should be minimized; consider apneic oxygenation with nasal prongs. If hyperventilation is required a laryngeal mask airway with adequate seal allowing capnography should be considered as an alternative to manual bag-mask ventilation.
To reduce coughing on emergence, remifentanil can be safely administered during the procedure and lidocaine (1-1.5 mg/kg of ideal body weight) can be administered intravenously after the seizure is completed.
Which of the following neurological manifestations has NOT being shown to be caused by SARS-CoV2?

A. Impaired consciousness
B. Peripheral sensory neuropathy
C. Acute stroke
D. Acute psychosis

Question contributed by Verghese Cherian
Central nervous system manifestations of COVID can present as dizziness, headache, impaired consciousness, acute cerebrovascular disease, ataxia, and seizures.


JAMA Neurol. 2020 Apr 10
Peripheral nervous system manifestations such as taste impairment, smell impairment, vision impairment, and nerve pain have been described.

Guillain-Barre syndrome has also been described.

Acute cerebrovascular event presenting as ischemic or hemorrhagic stroke may be seen in COVID

An incidence of 36% of COVID patient presenting with neurological manifestations has been reported.

Anxiety, depression, delusion, paranoia has been described especially among health care workers, which may be a fear of COVID rather than directly due to SARS-CoV-2.


Cureus. 2020 Mar 21
1. Anesthetic Management of Endovascular Treatment of Acute Ischemic Stroke During COVID-19 Pandemic: Consensus Statement from Society for Neuroscience in Anesthesiology & Critical Care (SNACC)

- Endorsed by Society of Vascular & Interventional Neurology (SVIN), Society for NeuroInterventional Surgery (SNIS), Neurocritical Care Society (NCS), and European Society of Minimally Invasive Neurological Therapy (ESMINT) and American Association of Neurological Surgeons (AANS) and Congress of Neurological Surgeons (CNS) Cerebrovascular Section

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