



EDITORIAL

COVID-19 and neurosurgical practice: an interim report

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THE COVID-19 (COVID) pandemic sweeping through North America in early 2020 has disrupted most aspects of normal American and Canadian life, and neurosurgical practice is no exception. This editorial will summarize conditions experienced at the authors' institutions as of late March 2020.

The foundations of an effective medical disaster response are often summarized as “staff, stuff, space, and systems.” For many disasters, skilled medical staff and necessary supplies (“stuff”) must be imported, a makeshift working facility (“space”) constructed, and more permanent health support systems put into place.

In the North American COVID pandemic, medical staff are already present. Instead, conserving skilled staff who are fit for work, despite a potentially threatening environment, has been the focus. Early in the pandemic, exposed or symptomatic medical staff have been liberally tested and removed from the workforce until they are asymptomatic and/or virally cleared, often with two negative tests required once a test has been positive. The frequency of non-COVID-related upper respiratory symptoms in winter and the slow initial pace of testing mean that many tests are eventually negative, but one or more workers can be sidelined at a critical time after exposure to a potentially infectious patient or colleague. Countermeasures including physical distancing on-site, eliminating face-to-face conferences and team rounds, limiting or barring visitors from

both inpatient and outpatient venues, and calling for most support staff to work from home with minimal on-site presence have been universal. Many facilities are requiring surgical masks for all clinicians or employees while on-site; a few centers require N95 mask use. Some centers require employees to attest to a lack of symptoms at the start of a work shift, though few, as yet, are measuring temperatures at the door. At some centers, telepresence or chart review has replaced physical presence for some consults. Decreased neurosurgical patient census due to elective case suspension allows residents and advanced practice providers (APPs) to be split into two or more teams that rotate in-house coverage weekly, with exposed or symptomatic residents replaced by workers from the “off” team when needed. Student presence is reduced, while residents on research rotations may be brought back into the clinical workforce. Where there are specialized workers with overlapping functions—for example, two outpatient APPs in a subspecialty—a similar rotation can prevent the simultaneous loss of both workers from a shared exposure.

Of concern to neurosurgeons, in addition to coincidental exposures to asymptomatic but COVID-positive patients with neurosurgical problems, is the recognition of the heightened risk of some neurosurgical procedures: transsphenoidal and endonasal surgery. Given early reports from China of exuberant transmission to multiple operating room (OR) personnel after transsphenoidal surgery in

COVID-positive patients, most centers have sharply curtailed the performance of such operations, limiting pituitary surgery to cases in which vision is compromised by chiasmal compression and considering transcranial surgery for these cases, even when ordinarily done transsphenoidally. Whenever possible, centers are requiring preoperative COVID testing (sometimes duplicate) to gauge risk. Appropriate personal protective equipment (PPE), such as N95 masks or powered air-purifying respirator (PAPR) units, for OR personnel, reduced physician and nursing staffing, and negative-pressure rooms or antechambers are required in varying combinations by most centers. Operations requiring a microscope would be difficult or impossible while wearing a PAPR. Whether operations in which other air sinuses or the mastoid are entered require the same precautions is not known, but many centers treat these cases equivalently. At some centers, all intubations are treated with special precautions, sometimes including a period allowing air exchange in the room before non-anesthesia personnel reenter. It should be noted that these policies are in rapid flux at many institutions and that clarity across different services (neurosurgery, anesthesia, otolaryngology) has been elusive at some centers.

A reduction in inpatient and outpatient volume protects both staff and patients from exposure and conserves potentially scarce hospital resources at all phases of the pandemic. Nearly all centers are sharply restricting or eliminating “elective” procedures, sometimes by state mandate, but what is elective and how long the deferral may last are both problematic. Both the Centers for Medicare and Medicaid Services (CMS) and the American College of Surgeons have provided guidance on what types of cases can be safely deferred (Appendix). From a neurosurgical perspective, cases for which a delay would risk life or permanent neurological deficit or the progression of neoplastic disease should proceed; severe symptoms may also warrant proceeding. The amount of time before elective operations can resume is obviously unknown, but surgeons have been told to plan for intervals of 4 weeks to 3 or even 4 months. No author has yet to experience resuming elective surgery and dealing with backlogs. In outpatient practice, and even some new patient evaluations, most centers have shifted many classes of follow-up to virtual visits. Institutions and professional organizations have offered guidance in billing for this type of interaction.

As implied above, unlike in many disasters, most needed neurosurgical supplies are already on-site and have long shelf lives, intact supply lines, and no increased demand or hoarding due to COVID. The dramatic exception is PPE, perhaps most acutely the supply of N95 masks. Current recommendations allow wearing each mask for more than one patient and using a regular surgical mask over the N95 to avoid droplet soiling. Re-sterilization of these masks is the exception so far. At most centers the supply of standard OR gowns, gloves, and the like is not immediately threatened, but in a rapidly evolving pandemic, that could change quickly.

The “space” needed to run a neurosurgical practice includes ORs, ICU beds, and inpatient beds. Some of these facilities are liable to be directly co-opted for COVID care (ICU beds) or adapted for this use (ORs converted to ICUs). Paradoxically, the newest inpatient facilities are of-

ten the easiest to convert to higher-acuity use, so services enjoying the most modern facilities are at risk of losing them. Postdischarge facilities such as rehabilitation hospitals may also be under pressure, as recovering COVID patients can need prolonged aftercare before returning home when the infection has been severe. As facilities are converted to new use, neurosurgeons may be called on to assume the care of non-neurosurgical patients in some capacity. To date, this has been limited to volunteer stints in low-acuity settings for most; unfortunately, this is likely to change, and at some centers neurosurgery staff, residents, and APPs are already assisting in COVID units.

Finally, we come to “structure.” We are accustomed to carefully designed, complex facilities in which to conduct our practice. But when hospitals become strained to the limit, some may be given over entirely to COVID care, potentially creating a need to transfer existing patients to a different facility or to set up neurosurgical practice in a new location. Modern practice has few models for this, perhaps the most recent being the final evacuation of Charity Hospital in New Orleans after Hurricane Katrina.¹ That successful effort, conducted against seemingly insurmountable obstacles, reminds us that ingenuity, dedication, and dogged effort have sustained neurosurgeons through dire times before, and will again.

Appendix

AANS and CNS COVID Resources Hubs: <https://www.aans.org/COVID-19-Update/COVID-19-Information-Hub>, <https://www.cns.org/covid-19>.

CMS Non-Emergent, Elective Medical Services, and Treatment Recommendations: <https://www.cms.gov/files/document/31820-cms-adult-elective-surgery-and-procedures-recommendations.pdf>.

American College of Surgeons COVID-19: Elective Case Triage Guidelines for Surgical Care: <https://www.facs.org/covid-19/clinical-guidance/elective-case>.

Specific types of neurosurgical cases:

- Society of NeuroInterventional Surgery Care Recommendations for Emergent Neurointerventional Patients in the Setting of COVID-19: <https://www.snisonline.org/care-recommendations-for-emergent-neurointerventional-patients-in-the-setting-of-covid-19/>.
- American Academy of Otolaryngology–Head and Neck Surgery COVID-19 Resources (re: transsphenoidal, endonasal, sinus, mastoid): <https://www.entnet.org/content/coronavirus-disease-2019-resources>.

ASSFN guidelines for surgery on deep brain and vagal nerve stimulators and implanted intrathecal pumps are under preparation at time of writing.

<https://thejns.org/doi/abs/10.3171/2020.4.JNS201099>

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Disclosures

The authors report no conflict of interest.

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Published online April 24, 2020; DOI: 10.3171/2020.4.JNS201099.