**Supplemental Digital Content**

**Methods**

The literature on COVID-19 epidemiology and transmission was reviewed on March 27th using the keywords “SARS-CoV-2”, “COVID-19” and “2019 nCov” in the Pubmed database. All titles and abstracts were screened to select the most relevant papers. Further studies were identified from the bibliographies of selected papers and a narrative review was produced. Based on the identified modes of transmission, the lead author first created a list of neurosurgery-specific measures to potentially limit the nosocomial infection of OR personnel. The list was then circulated to a panel of volunteers including functional (C.I-M., M.H., C.S.), oncology (D.F.), trauma (H.J.W.), vascular and skull base (M.L.), spine (N.D., S.C.) and pediatric (J-P.F, P.J.M.) neurosurgeons from eight academic centers in four Canadian provinces as well as to an anesthetist (F.D.), an otolaryngology-head and neck surgeon (S.B.) and an infectious disease specialist (A.C.). Two surgeons also had a special interest in neuroethics (P.J.M. and D.F.). All authors commented on each measure and improved the list through a Delphi process. The final measures were chosen by consensus after multiple iterations. They are meant as concepts to be considered by neurosurgical teams as they prepare to operate patients during the pandemic.

**Ethics of triaging as an infection-control measure**

*Triaging patients in the setting of a pandemic*

While every effort should be made to mitigate perioperative nosocomial transmission, the most effective strategy remains to not operate at all. In the setting of a pandemic, there are two distinct situations where this decision might be made. The first is when the surgical indication and/or timing is controversial or that equally acceptable alternatives exist. The goal in this case is to delay exposure to the OR until after the pandemic, where the risks of nosocomial transmission should be lower. This situation applies to all elective procedures (e.g. benign tumors, functional disorders, prophylactic vascular treatments, degenerative spinal disease), but can also apply to emergent cases where temporizing measures can be performed (e.g. Omaya reservoir and serial aspiration of a cystic craniopharyngioma rather than full open resection) or when the benefit of surgery is unclear (e.g. decompressive craniectomy for severe TBI, frontal sinus fracture repair). In the current context, if properly explained, we anticipate that most patients given this choice will be happy to delay surgery or try an alternative first.

The second situation occurs when the healthcare system is overwhelmed by cases from the pandemic, as is currently happening in Europe.1,2 In this context, patients bearing a very poor prognosis might be directed toward nonintervention because of resources paucity.3-6 Making these kind of decision will be daunting as it should be noted that “there is no ethical difference between withholding and withdrawing a care”.7 While acknowledging the intense requirements of critically ill neurosurgical patients, neurosurgeons should still ensure that resource allocation is not directed solely to COVID-19 patients at the expense of all others. Principles such as maximizing benefits, the use of random selection or not, promoting instrumental value (and benefits to others), age and comorbidities will all need to be carefully weighted.8 Many authors argue that “triage systems based even on limited evidence are ethically preferable to those based on clinical judgement alone”.7 For neurosurgical diseases, existing prognostic systems can be used, such as the CRASH score in TBI9,10 and the DS-GPA models in oncology11 to help reduce futility. For COVID-19 patients, a retrospective cohort of 191 admissions in China identified the following surrogates as foreshadowing a dismal outcome: an older age, a high sequential organ failure assessment (SOFA) score, d-dimmer >1μg/mL and lymphopenia.12 Moreover, comorbidities such as hypertension, coronary heart disease and diabetes also portended an adverse outcome. Hence, based on these elements, a triage algorithm could be built centered on the SOFA score, which is reasonably predictive.

*Duty to Care*

Ultimately, there is widespread agreement that health care providers (HCPs), including neurosurgeons, have an ethical duty to provide care, even if the provision of that care exposes the HCP to risk. In the context of the COVID-19 pandemic, neurosurgeons will encounter patients, and indeed other HCPs who are COVID-19 positive or suspect, both in the OR and during other clinical interactions. There is agreement among ethicists, however, that the ethical duty to care is not absolute. Evidence from the 2003 SARS outbreak and 2009-2010 H1N1 pandemic suggests that HCPs and lay people agree that the duty to care exists in the context of a broader social contract that ensures proper protection and mitigation of that risk.13,14 For COVID-19, that would mean ensuring provision of proper PPE for high risk interactions or operations and consideration of limiting exposure to neurosurgeons in high risk categories, including older neurosurgeons or those with a concomitant illness that would increase their risk of death or severe morbidity if they contracted the virus.

**References for supplementary material**

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