

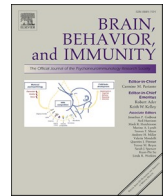


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Letter to the Editor

Intracranial hemorrhage and COVID-19, but please do not forget “old diseases” and elective surgery



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Dear Editor,

The current COVID-19 pandemic, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread across the world with over 55,000,000 reported cases. Patients typically present with fever, shortness of breath and cough, but some patients presented with additionally neurologic manifestations, such as headache, loss of smell and taste, stroke, intracranial hemorrhage (ICH) and seizures, suggesting that SARS-CoV-2, displays neurotropism and enters the central nervous system (Di Carlo et al., 2020). Patients with COVID-19 infection are at increased risk for thrombotic events, as various anticoagulation regimens are now being considered for these patients. Anticoagulation is known to increase the risk for adverse bleeding events, of which ICHs are one of the most feared (Dogra et al., 2020), with a reporting overall mortality rate of about 48.6% in the COVID-19 patients with ICH (Cheruiyot et al., 2020).

I read publications on “Intracerebral haemorrhage and COVID-19: Clinical characteristics from a case series” and on “The COVID-19 emergency does not rule out the diagnostic arsenal in intracerebral hemorrhage: do not forget the old enemies” with a great interest (Benger et al., 2020; Cucu et al., 2020). Benger et al. (2020) reported the clinical, radiological and laboratory characteristics of ICH in COVID-19 patients that are much less described compared to ischaemic strokes in patients with COVID-19. On the other hand, Cucu et al. (2020) pointed out the attention that not only primary ICHs can occur in COVID-19 patients, but also secondary ICHs due to arteriovenous malformations (AVMs), aneurysms, cavernous malformations, dural arteriovenous fistulas (dAVFs), cerebral venous sinus thrombosis and brain tumors, suggesting us not to forget “old enemies” also non-COVID-19 patients at this historic moment. Neurovascular, brain tumor, dementia and other chronic brain diseases are always present in a certain percentage among the population.

Elective surgery in many hospitals all over the world has been cancelled to ensure adequate hospital capacity to respond to COVID-19 and to expand their intensive care capacity. This is correct, but although most operations and procedures are described as “elective,” these interventions are essential contributors to patient health, to the wellbeing

of communities and to the good quality of life of people (Meredith et al., 2020). Some elective and most non-elective surgeries must continue throughout any pandemic as “old diseases” continue to exist and non-COVID-19 patients require to be treated also for other neurosurgical, neurological and psychiatric pathologies. Lockdown due to the COVID-19 pandemic has caused significant disruption to brain cancer diagnosis and management, as well as a less precise management of patients with chronic brain neurological and psychiatric diseases.

For this reason, if the prevalence of COVID-19 is not too high and hospital resources are coping with demand for ward and ICU beds, more elective surgery must be recommended, as not all other diseases can wait the end of pandemic. Although COVID-19 ban on elective surgeries might show us some people can delay them especially degenerative pathologies of the spine, surgery is an essential part of modern medicine (Myles and Maswime, 2020).

Globally just right after the first COVID-19 wave, many governments and professional bodies moved from a position of curtailment to reopening of elective surgery, even if this requires low prevalence in the community and access to SARS-CoV-2 testing, ensuring sufficient hospital, ICU beds and all other necessary medical supplies (Myles and Maswime, 2020). Patients with chronic medical diseases can be followed by telemedicine, a good and essential tool to avoid unnecessary travel to hospitals and clinics reducing the potential risk of COVID-19 infection (Montemurro and Perrini, 2020), whereas surgical brain and spine elective diseases necessarily require access to the hospital. The emotional toll is also substantial and must be taken into account at this time, with patients delaying preventive care or operations because of concern about exposure to SARS-CoV-2, along with anxiety and apprehension over the safety of returning to health care centers (Meredith et al., 2020; Montemurro, 2020). COVID-19 might affect access to elective safe surgery, especially in low-income and middle-income countries and for homeless people, migrants and refugees.

Declaration of Competing Interest

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence

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References

- Di Carlo, D.T., Montemurro, N., Petrella, G., Siciliano, G., Ceravolo, R., Perrini, P., 2020. Exploring the clinical association between neurological symptoms and COVID-19 pandemic outbreak: a systematic review of current literature. *J. Neurol.* 1, 1–9. <https://doi.org/10.1007/s00415-020-09978-y>.
- Dogra, S., Jain, R., Cao, M., Bilaloglu, S., Zagzag, D., Hochman, S., Lewis, A., Melmed, K., Hochman, K., Horwitz, L., Galetta, S., Berger, J., 2020. Hemorrhagic stroke and anticoagulation in COVID-19. *J. Stroke Cerebrovasc. Dis.* 29 (8), 104984 <https://doi.org/10.1016/j.jstrokecerebrovasdis.2020.104984>.
- Cheruiyot, I., Sehmi, P., Ominde, B., Bundi, P., Mislani, M., Ngure, B., Olabu, B., Ogeng'o, J.A., 2020. Intracranial hemorrhage in coronavirus disease 2019 (COVID-19) patients. *Neurol. Sci.* 3, 1–9. <https://doi.org/10.1007/s10072-020-04870-z>.
- Benger, M., Williams, O., Siddiqui, J., Sztrih, L., 2020. Intracerebral haemorrhage and COVID-19: Clinical characteristics from a case series. *Brain Behav. Immun.* 88, 940–944. <https://doi.org/10.1016/j.bbi.2020.06.005>.
- Cucu, A.I., Turliuc, M.D., Ciurea, A.V., 2020. The COVID-19 emergency does not rule out the diagnostic arsenal in intracerebral hemorrhage: do not forget the old enemies. *Brain Behav. Immun.* 11 <https://doi.org/10.1016/j.bbi.2020.11.020>.
- Meredith, J.W., High, K.P., Freischlag, J.A., 2020. Preserving elective surgeries in the COVID-19 pandemic and the future. *JAMA.* <https://doi.org/10.1001/jama.2020.19594>.
- Myles, P.S., Maswime, S., 2020. Mitigating the risks of surgery during the COVID-19 pandemic. *Lancet* 396 (10243), 2–3. [https://doi.org/10.1016/S0140-6736\(20\)31256-3](https://doi.org/10.1016/S0140-6736(20)31256-3).
- Montemurro, N., 2020. The emotional impact of COVID-19: From medical staff to common people. *Brain Behav. Immun.* 87, 23–24. <https://doi.org/10.1016/j.bbi.2020.03.032>.
- Montemurro, N., Perrini, P., 2020. Will COVID-19 change neurosurgical clinical practice? *Br. J. Neurosurg.* 1, 1–2. <https://doi.org/10.1080/02688697.2020.1773399>.

Nicola Montemurro^{a,b,*}

^a Department of Neurosurgery, Azienda Ospedaliera Universitaria Pisana (AOUP), Pisa, Italy

^b Department of Translational Research and New Technologies in Medicine and Surgery, University of Pisa, Pisa, Italy

* Address: Department of Translational Research and New Technologies in Medicine and Surgery, University of Pisa, Via Savi, 10 – 56126 Pisa, Italy.

E-mail address: nicola.montemurro@unipi.it.

¹ <https://orcid.org/0000-0002-3686-8907>.