



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

## Letter to the Editor: Challenges to Neurosurgical Residency Training During COVID-19 Pandemic: An Indian Perspective



### LETTER:

The 2019 novel coronavirus disease (COVID-19) pandemic, attributed to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has now affected the entire globe with cases reported from 215 countries. As of May 17, 2020, there are >4.77 million confirmed cases and >315,000 deaths.<sup>1</sup> It is a pandemic in the truest sense of the term, and no definite treatment or vaccine appears to be in sight for months. In such times, physicians and allied medical professionals stand at the frontlines, caring directly for infected patients while also continuing to provide medical care to patients who do not have COVID-19.

In most health systems around the world, the junior doctors, residents, and fellows make up a majority of the workforce providing direct care to inpatients and patients presenting to emergency departments.<sup>2</sup> During a health crisis such as the COVID-19 pandemic, they continue to be important pillars in managing and treating patients. Moreover, residents are required to manage routine hospital responsibilities using their still-growing knowledge and skills in such unparalleled times. They have many valid apprehensions, the most important of which being that their training has taken a backseat while they remain in a training program of a finite duration. This has presented resident trainees today with a unique and unprecedented challenge to keep up with a still-evolving health crisis. Residents, as part of the medical staff, have an ethical obligation to provide clinical care to all patients. However, the needs of the resident group must also be considered in any pandemic preparedness. In this letter, we discuss the challenges and inherent opportunities for neurosurgical trainees during this period, especially in a resource-constrained country such as India.

### ROLE OF A NEUROSURGEON IN THIS PANDEMIC

In the face of this pandemic, most governments moved to limit the spread of the virus by imposing different forms of lockdown or stay-at-home orders. Consequently, hospitals, especially in the public sector, closed down all or some parts of routine non-emergent services to make available resources and personnel for managing patients with COVID-19. This was also important to avoid making hospitals giant hotbeds of transmission by limiting the visits of patients not requiring urgent care. However, neurosurgery, being an emergency branch, needs to continue to function as critically ill patients present with emergent indications, including, but not limited to, aneurysmal subarachnoid hemorrhage, malignant middle cerebral artery infarct, parenchymal hypertensive hemorrhage with raised intracranial pressure, malignant brain tumors with mass effect, tumors with hemorrhage,<sup>3</sup> cystic degeneration in craniopharyngioma and pituitary apoplexy (both with rapidly deteriorating vision), subacute and chronic subdural hematomas, and cauda equina syndrome. An intelligent and need-based utilization of the available resources hence becomes important.<sup>4</sup>

Although the COVID-19 disease primarily affects the respiratory tract,<sup>5</sup> neurosurgeons may be involved with dealing with this virus in one of the following ways:

- Caring for confirmed COVID-19–positive patients presenting with unrelated neurosurgical issues
- Caring for patients with contact history or symptoms suspicious for COVID-19 requiring urgent neurosurgical care
- Caring for patients in a general emergency department or intensive care unit that may also be caring for patients positive for or suspected to have COVID-19
- Directly caring for COVID-19–positive patients, using their experience in the intensive care unit and in managing patients on life support

In such a scenario, hospitals worldwide including ours have sought to limit exposure to health care workers by dividing the departmental workforce into teams, with only 1 team working at a time, while another team serves a mandatory rest/quarantine period, and a third team remains available as backup.

### CHANGES IN THE NEUROSURGERY WORK ENVIRONMENT

A number of changes have been instituted in the way neurosurgery is practiced. This will further continue to evolve in the coming months as the medical community learns to live and work with this viral pandemic. In our academic hospital (as in many hospitals in India), testing remains limited to patients showing definite symptoms or having a positive contact/travel history. This is in accordance with the government guidelines for optimal utilization of the resources.<sup>6</sup> A screening questionnaire is administered to all patients arriving in the emergency department. Temperature screening is done for all patients and hospital staff. While this is necessary, it is only the bare minimum, and personal protective measures remain more important. All health care workers have been instructed to follow universal precautions such as frequent hand hygiene, social distancing measures, and the use of appropriate masks based on their risk exposure. Neurosurgical residents are frequent visitors to the emergency department and intensive care unit and must strictly adhere to these guidelines for their protection and that of other patients under their care.

The neurologic examination of patients is also being tailored, for example, avoiding fundus examination to decrease the risk of exposure.<sup>7</sup> Intraoperative and perioperative practices have also undergone a change. Even if a patient passes the screening criteria or is tested once and found to be negative, the patient can by no means be considered entirely safe. Screening questionnaires have fallacies, and reverse transcriptase polymerase chain reaction tests done for SARS-CoV-2 have a high false-negative rate.<sup>8</sup> Hence, all appropriate precautions need to be taken for every surgical procedure performed. In our hospital, surgeons are now instructed to enter the operating room only after the patient has been intubated and to exit before removal of the endotracheal tube to avoid exposure to aerosols. Such distancing may make conscious and alert patients more anxious in the perioperative period, as they enter the

intimidating operating room environment without the familiar face of their neurosurgeon being around them.

Endoscopic endonasal procedures are being avoided.<sup>4</sup> Use of high-speed drills is discouraged during transcranial procedures to avoid a potential risk of aerosol generation.<sup>4</sup> This has forced many surgical trainees to use the Hudson brace and Gigli saw that they may not have used otherwise. In most emergency neurosurgical procedures, the duration of craniotomy remains crucial to relieve intracranial pressure. Hence, trainees have to learn to efficiently use these instruments to ensure they reach an intracranial tumor or hematoma in the least amount of time possible. This pandemic has also evolved our thinking to question whether the many spinal fixation procedures we perform are actually even needed.<sup>9</sup>

Surgeons also have been forced to rapidly learn to operate wearing personal protective equipment. N95 masks and face shields have been shown to reduce oxygen saturation levels and cause symptoms such as headache, respiratory difficulty, and increased fatigue.<sup>10</sup> A full personal protective equipment suit also limits dexterity and motor movements. Face shields and goggles are prone to fogging and can limit vision. For neurosurgical residents still learning their craft, this change in operating conditions has added a sense of hostility to an already steep learning curve.

However, one may find a silver lining in every dark cloud. In our hospital, the number of emergency procedures has marginally increased since routine ORs have been temporarily shut and all necessary procedures are performed only on an emergency basis. The department has divided neurosurgical procedures into emergency, semiemergency, and nonemergency categories to triage.<sup>4</sup> Only emergency and some semiemergency (based on the patient's clinical condition) procedures have been performed in the last 8 weeks since India instituted a strict lockdown and routine hospital services were closed. Despite this change, we have performed a total of 41 procedures in 8 weeks, which is higher than our department's monthly average of 15–20 emergency surgeries. We believe that this may be due to more patients reporting to a tertiary public sector hospital such as ours, as private and corporate hospitals have also curtailed their routine work owing to nonavailability of appropriate resources and testing facilities. This provides a continual learning and operative opportunity for trainees in teaching hospitals. Moreover, attending physicians who are part of the working team have more time and freedom to educate and assist surgical trainees during this period.

#### TIME MANAGEMENT AND WORK-LIFE BALANCE

While working in a group-based system does limit exposure to the virus, it also presents its own challenges. Because the number of working faculty and residents is less at any given time, physicians on duty have to shoulder the entire burden: caring for inpatients, telephone consultations, emergency consultations, and emergency surgeries. An already rigorous residency program hence becomes even more perplexing if the number of neurosurgical emergencies remains the same or even marginally increases. There have also been reports of increased threat perception and emotional disturbance among residents during this pandemic.<sup>11</sup> Moreover,

residents are always required to keep track of their research and academic work because the residency period remains finite, and proficiency expectations from a trainee at the end of this period would not change. Senior faculty and academic counselors have an important role to play to ensure effective utilization of the residents' time and efforts.

#### ACADEMIC ACTIVITIES

Ward rounds and classroom teaching have undergone a sea change. Routine classroom teaching has been replaced by web-based seminars, online platforms for sharing presentations, and online forums for discussion. These ensure continuation of medical education. Academic visits or conferences have all but come to a standstill, and it remains to be seen if these changes become even partially permanent.

#### FAMILY AND SOCIAL RESPONSIBILITIES

Many trainees, consequent to the age group to which they belong, share living space with aging parents, pregnant wives, or young children. They have to bear in mind the protection of their family members while returning from duties at the hospital. Many trainees are forced to make temporary living arrangements or use hospital-provided accommodation for staying during duty days or during a quarantine period following potential exposure.

As the world battles the COVID-19 pandemic, the field of neurosurgery also needs to rise up to this challenge of continuing care for patients. The role of a neurosurgical resident is important for managing both COVID-19-positive patients and patients without COVID-19. Their status as neurosurgeons-in-waiting provides them with a responsibility to understand the learning opportunities during this time, while also handling the challenges they face. They must strive to continue their surgical and academic training, while also ensuring that their primary responsibilities as a doctor do not suffer.

**Jigish Ruparelia, Jaskaran Singh Gosal, Mayank Garg, Suryanarayanan Bhaskar, Deepak Kumar Jha**

Department of Neurosurgery, All India Institute of Medical Sciences, Jodhpur, Rajasthan, India  
To whom correspondence should be addressed: Deepak Kumar Jha, M.Ch.  
[E-mail: drdeepakjha@gmail.com]

Conflict of interest statement: The authors declare that the article content was composed in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

<https://doi.org/10.1016/j.wneu.2020.05.178>

#### REFERENCES

1. Worldometer. COVID-19 coronavirus pandemic. Available at: <https://www.worldometers.info/coronavirus/>. Accessed May 17, 2020.
2. Zare MH, Ahmadi B, Sari AA, Arab M, Kor EM. Quality of working life on residents working in hospitals. *Iran J Public Health*. 2012;41:78-83.
3. Gajbhiye S, Gosal JS, Pandey S, Das KK. Apoplexy inside a giant medial sphenoid wing meningothehal (grade I) meningioma: an extremely rare but a potentially dangerous complication. *Asian J Neurosurg*. 2019;14:961-963.
4. Gupta P, Muthukumar N, Rajshekhar V, et al. Neurosurgery and neurology practices during the novel COVID-19 pandemic: a consensus statement from India. *Neurol India*. 2020;68:246-254.
5. Zhu N, Zhang D, Wang W, et al. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med*. 2020;382:727-733.

6. Indian Council of Medical Research Department of Health Research. Strategy for COVID19 testing in India. Available at: [https://www.icmr.gov.in/pdf/covid/strategy/Testing\\_Strategy\\_v5\\_18052020.pdf](https://www.icmr.gov.in/pdf/covid/strategy/Testing_Strategy_v5_18052020.pdf). Accessed June 4, 2020.
7. Bhaskar S, Gosal JS, Garg M, Jha DK. Letter: the neurological examination. *Oper Neurosurg (Hagerstown)*. 2020;18:E262.
8. Li Y, Yao L, Li J, et al. Stability issues of RT-PCR testing of SARS-CoV-2 for hospitalized patients clinically diagnosed with COVID-19. *J Med Virol*. 2020;92:903-908.
9. Bhaskar S, Gosal JS, Garg M, Jha DK. Letter to the editor regarding “why would two patients with no disease be offered unnecessary transforaminal lumbar interbody fusions? *Surg Neurol Int*. 2019;10:238.
10. Roberge RJ, Coca A, Williams WJ, Powell JB, Palmiero AJ. Physiological impact of the N95 filtering facepiece respirator on healthcare workers. *Respir Care*. 2010;55:569-577.
11. Galbraith N, Boyda D, McFeeters D, Hassan T. The mental health of doctors during the Covid-19 pandemic [e-pub ahead of print]. *BJPsych Bull* <https://doi.org/10.1192/bjb.2020.44>. Accessed May 17, 2020.