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Neurosurgical Training During COVID-19 Pandemic: British Perspective

Jacob Chen Ming Low[1], *Ravindran Visagan*[2], *Andrea Perera*[3]

COVID-19 is a global pandemic that has had an unprecedented effect on health care systems globally. The infrastructure of British neurosurgical practice has had to adapt and react to the challenges of the National Health Service (NHS) in several ways. This crisis is an opportunity for trainees to reflect on and explore alternative training opportunities. Below, we discuss the clinical and educational impact of COVID−19, potential training opportunities during this period, and the long-term impact on training.

CLINICAL IMPACT

The impact on delivery of the neurosurgical service in the United Kingdom has been substantial. Since the early surge in COVID-19 cases in the United Kingdom, there have been dramatic effects on caseload, resource allocation, clinical prioritization, decision making, and the neurosurgical workforce. Firstly, the caseload in neurosurgery has shifted to provide primarily an emergency service while elective neurosurgery has been suspended. This clinical prioritization is partly to ration intensive care beds and resources in the form of staff and equipment, vital in supporting patients who deteriorate from respiratory compromise associated with COVID-19. It is also vital in reducing unnecessary viral exposure to at-risk cohorts. This redistribution of hospital resources to combat COVID-19 has reshaped neurosurgical decision making with respect to both the timing and clinical thresholds of decisions to transfer emergent cases. Finally, the workforce has been depleted in part due to redeployment; however, many units have adapted rotations to minimize the workforce exposed—running a skeletal service with reserve teams in place in case of sickness. Such local policies have also been influenced by national guidance to minimize the impact of COVID-19 on neurosurgical service delivery.

NEUROSURGICAL CONTINGENCY PLANS AND U.K. GUIDELINES

The Society for British Neurological Surgeons has released official guidance for adult and pediatric neurosurgical services, as well as subspecialty specific guidance in the context of COVID-19.[1,2] Examples include the suspension of endoscopic surgery, as this is associated with a high risk of viral transmission. Alternative surgical approaches such as craniotomy for sellar lesions or the microscopic transphenoidal nondrilling submucosal approach have been advocated in emergency cases. In the setting of a subarachnoid hemorrhage, if a perimesencephalic pattern is suspected on CT and an attending neuroradiologist confirms a negative CT angiogram, these patients are not transferred for a confirmatory digital subtraction angiography.

Neurosurgical decision making has become reactive in the context of the COVID-19 pandemic with attempts to filter nonessential cases and minimize COVID-19 exposure to health care workers. The emphasis in the United Kingdom is on the most senior surgeon available performing the operation with senior anesthetic support to reduce operative times. Prioritized cases include but are not limited to acute hydrocephalus, neuroaxis infections requiring surgery, traumatic brain injury, and neuro-oncology. Spinal networks have adapted to encourage local units to perform diagnostic imaging and local spinal surgery where possible to avoid unnecessary transfers to regional centers.

EDUCATIONAL IMPACT

As outlined so far, COVID-19 has affected multiple streams of neurosurgical practice requiring trainees to adapt to maintain a safe service for both patients and staff. Beyond a significant reduction in conventional training opportunities, such as elective operating room lists, the nationally advocated social distancing measures have led to the cancellation of departmental educational meetings, subspecialty multidisciplinary team meetings, and outpatient clinics. These settings have always provided invaluable clinical exposure and opportunities for direct feedback from senior neurosurgeons.

TRAINING OPPORTUNITIES

Telemedicine

Telemedicine has been reported in the neurosurgical literature and has mainly been used as a cost-effective means to serve rural communities with limited access to neurosurgical evaluation.[3-5] In the developing world, this modality also allows us to support hospitals with a limited trauma network.[6] In an attempt to reduce inpatient and outpatient hospital attendances, some units have introduced telephone or videoconference consultations. Trainees may find this method daunting—obtaining sufficient clinical information to make safe management decisions. Communication via telemedicine is not a skill taught in medical school. This method of consultation may require a certain degree of creativity and imagination and force us to sharpen our communication skills. Without conventional methods of examining the patient directly, trainees may be forced to explore other methods of eliciting neurologic deficits. For example, to examine the motor system, patients may be able to demonstrate strength by testing myotomes with household items or dumbbells. To examine the sensory system, a family member, under the instruction of the consulting neurosurgeon, may examine the patient using household items such as cotton or a blunt sewing needle. These methods may not be as accurate as a conventional examination; however, they should elicit sufficient information to allow trainees to make safe interim clinical decisions and elicit any concern for rapidly deteriorating

neurologic conditions. With the patient's permission, these consultations can also be recorded and discussed with a senior colleague at a later date.

Redeployment to Nonneurosurgical Services

Within the NHS, some neurosurgical trainees have been redeployed to other departments to help with the unprecedented demand of medical patients. These assignments can include intensive care units (ICU), emergency medicine, and internal medicine. As part of a structured training program, these rotations represent an invaluable training opportunity for neurosurgical trainees.[7] While we are trained as neurosurgeons, it is imperative to remember that we are also primarily doctors; who are able to demonstrate sufficient knowledge, skill and ability to manage sick patients. Much like neurosurgery, medicine is ever changing; as such, many methods of medical management will have changed since trainees completed their intensive care unit rotations. Redeployment allows us to refresh our medical knowledge and learn of emerging therapies. This may include fluid management, blood pressure management, and the contemporary use of antimicrobials.

National Multidisciplinary Meetings

In the United Kingdom, trainees may spend their entire residency in a single dedicated neurosurgical unit. Exposure to a diversity of management practices and patient populations is limited. Using videoconferencing platforms, trainees have been able to participate in nationally coordinated webinars. These bring together consultants and trainees from units across the country to actively learn and discuss neurosurgical topics. Experts from around the country are able to combine their knowledge and experiences to present topics with a much more diversified view. Furthermore, technologic advancements in video conferencing allow participants to view slides that presenters refer to, ask questions in real time, participate in synchronous forum discussions, and participate in interactive quizzes. The combined wealth of knowledge and available technology has immense potential to enhance the training experience of neurosurgeons on a local and national scale.

Crisis Management

This pandemic is also a unique opportunity to gain valuable experience in crisis management and leadership. Acquiring management and leadership skills is often overlooked. Redeployment during COVID-19 provides a thought-provoking insight into how to manage a team and structure an organization when dealing with a large-scale emergency. There are opportunities to observe and learn from excellent examples of leadership, as well as learning from potential challenges. The experience gained will no doubt aid our response and decision making when dealing with future neurosurgical and major trauma emergencies.

Resources

Finally, in the "open access" era of medicine, there is an abundance of online resources that trainees can access to reinforce knowledge and their operative experience. The American Association of Neurological Surgeons has a wealth of videos including "neurosurgical online sessions" that guide viewers through basic principles of neurosurgery, commonly encountered surgical approaches, and anatomy lectures from the Rhoton series. The department of neurosurgery at the University of California, Los Angeles has released a podcast series that provides the foundations of key neurosurgical topics that trainees should be familiar with. Lastly, the Joint Neurosciences Council has also created an online e-learning program that encompasses core topics in both postgraduate neurology and neurosurgical curriculums.

LONG-TERM EFFECTS ON NEUROSURGICAL TRAINING

As this pandemic continues, concerns have arisen around a global reduction in elective operations and the maintenance of surgical logbooks. As trainees, we are ultimately a product of our training and experience. We must acknowledge the potential impact on training in all specialties, not just neurosurgery. A proposed extension of training to counter a reduction in operative cases and time spent in redeployment would seem reasonable, although this would come at a cost. For a highly practical specialty, there seems to be no reasonable alternative to make up for the shortcomings. Simply ignoring this hiatus in training does not do justice to the importance of practical experience in what is considered to be a highly technical specialty. As described in this article, there exists a myriad of training opportunities that have the potential to positively contribute toward a trainee's development as a neurosurgeon. During this difficult time, every effort must be made to grasp training opportunities where possible.

This pandemic will have a lasting impact on training. Once we come through this crisis, we will need to work in unison to address the long-term threats to training appropriately. Whether consciously or subconsciously, our experiences within the current crisis will shape the "COVID-19 generation" of neurosurgical trainees.

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From the Departments of Neurosurgery, [1]Charing Cross Hospital, [2]King's College Hospital, and [3]St. George's Hospital, London, United Kingdom

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