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.

Neurosurgical Practice at the Time of COVID-19

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Currently, we are facing a global public health emergency, after an exponential outbreak of a novel coronavirus disease (COVID-19), caused by SARS-CoV-2 infection. It began its foothold from the Wuhan province in China on December 26, 2019,[1] and within a very short time span, it was declared a pandemic on March 11, 2020, by the World Health Organization (WHO).

A few weeks ago, the outbreak mainly involved Italy, starting from Lombardy, the region with one of the highest health resources in the country. The first case was recorded on February 18, 2020, and since then the exponential growth has greatly increased surpassing the China cases (81,669 cases). In Italy, according to worldometer (https://www.worldometers.info/coronavirus/country/italy/), a website tracking COVID-19 cases, the total number of positive COVID cases are 124,632 with 15,362 deaths and 20,996 recovered patients (effective date as of April 5, 2020). In a short time, Italy has been surpassed by Spain, which has the second-highest number of COVID cases (130,759 with 12,418 deaths), and the USA, which holds the dramatic record of infected cases (311,637 with 9,454 death). However, the reason why the number of deaths in Italy is so high compared with other countries is still unknown. One factor may be the age of its population because Italy has the oldest population in Europe, with approximately 23% of residents 65 or older. However, some concerns have been raised regarding the different testing strategies, thus accounting for dissimilarities among the counties.[2]

The high surge of angiotensin II induces pulmonary vasoconstriction, causing hypoxemia from the ventilation-perfusion mismatch, ultimately leading to acute lung injury or acute respiratory distress syndrome. The angiotensin-converting enzyme 2, the receptor for SARS-CoV-2, though found almost exclusively within the respiratory epithelium, is also seen in the renal tubular cells, hepatic cholangiocytes, and cardiocytes.[3] This could account for the multiorgan involvement in high-risk patients with COVID. A study from China identified that almost 85.5% of patients had evidence of extrapulmonary disease with cardiac involvement seen in almost 74% of these cohort groups.[4] The characteristic computed tomography chest scan findings include bilateral ground-glass opacities, whereas the hyaline membrane and interstitial thickening are the pathognomonic histologic changes identified in the disease.[5]

Although fever is considered the hallmark of the onset of COVID-19 and strictly body temperature screening protocols have been adopted in most parts of the world, a study has revealed that only 43.8% of patients had a fever on admission.[6] Another alarming issue is the report of more than 3300 health care workers confirmed with COVID-19 as of early March.[7]

The main means of virus propagation is through airborne transmission via respiratory droplets that remain aloft on the surface for a long period, thereby underscoring the rationale for strict adherence to social distancing. The strong mitigation and timely implementation of lockdown are of paramount importance to halt public movements and thereby prevent an upsurge in the disease counts.

After the increase in the caseloads, many hospitals have reshaped their face and turned into makeshift facilities for rapid testing and management of infected individuals. Containment and intensive care management with proning and protective lung ventilation are the pivotal steps in the critical care management plan.[8] In this dire scenario, the lack of ventilators has paved the way for noninvasive ventilation solutions reveling an unprepared health system, lacking adequate personal protective equipment, with frontline health workers courageously committed to fighting a war with no ammo.

The spotlight on COVID has overshadowed other health threats in which treatments are at risk for conventional management. Neurosurgery also has been left crippled by this pandemic. Most of the elective surgeries have already been canceled. Although the incidence of road traffic accidents might have decreased, owing to the lockdown, the neurosurgeons still need to plan emergent care for patients with cardiovascular accidents, acute hydrocephalus, and tumors with impending herniation. Moreover, all of their patients are at risk for finding available beds in intensive care units, and for those in the intensive rehabilitation unit, the discharge from hospital is almost difficult. The study from Italy has provided a framework for creating an emergency task force and creating focused treatment hubs.[9] They have implemented transfer of needful patients into these hubs either primarily or through secondary transport from the peripheral spokes. Most of the urgent neurosurgical procedures can be performed by a strict number of operators. The clinical situations defined as neurosurgical emergencies are cerebral hemorrhage, acute hydrocephalus, brain tumor with a forthcoming risk of intracranial hypertension, traumatic brain and spinal cord injury, and spinal cord compression.[9] Also, a direct neurosurgical involvement in the management of infected patients cannot be excluded because of the recent evidence of acute brain hemorrhage observed in patients with COVID-19.[10]

Another aspect to be of concern in neurosurgery is pertaining to the continuation of residency programs. To date, most of the academic educational activities have been halted and residents from various specialties, including neurosurgery, have been reassigned to the new COVID wards. In this unforeseeable scenario, remote education, telementoring, virtual teaching, cloud learning, and virtual rounds are valuable alternative models for continuing education and preventing the sense of isolation and depression that is sweeping over the weeks.

The current toll in the global front can be a mere snapshot of this unfathomable onslaught. There needs to be judicious use of health resources for ramping up our quest to conquer COVID-19. Till we have redemption of this "Pandora's Box," there is the utmost need to implement proactive steps and to be a trusted portray of the health information rather than being "infodemic."

This is the time we the neurosurgeons realize the importance of simple hand washing and infection control adherence while managing our patients. This is the time we keep ourselves safe for

the upcoming surge in the elective neurosurgical cases. This is the time to prepare ourselves for the probable task shifting among task force and the front lines to manage the unprecedented surge in the critical patient with COVID-19. This is the time to make ingenious efforts to limit this pandemic to avoid frustrating the sacrifice of the lost health workers.

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