

Approaches to global stroke care during the COVID-19 pandemic

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INTRODUCTION

Since the outbreak of coronavirus disease 2019 (COVID-19), the healthcare system of the world has been overwhelmed by this pandemic. The most recent statistic showed that there are now over 3 million people infected and over 259 000 deaths in 210 countries.¹ This pandemic has presented a major challenge to the care of patients with other medical conditions such as stroke, which affects 1 in 4 people over the age of 25 in their lifetime and kills about 5.5 million each year.^{2,3} There have been reports showing that stroke centres and hospitals are seeing a significant drop in stroke admissions since the pandemic.^{4,5} Realising this challenge and urgency, the Chinese Stroke Association convened a group of international stroke leaders and discussed the challenges facing stroke care worldwide and recommendations of stroke care during the COVID-19 pandemic.

BACKGROUND

The COVID-19 pandemic is at different stages in different countries. While China is slowly opening up its cities after the lockdown, some countries may be at the plateau stage and others have not reached the peak yet. COVID-19 is unlikely to be a short-term pandemic. Both Korea and China have seen pockets of resurgence of cases. There is concern that a second wave of the pandemic may come in the fall of 2020.⁶ COVID-19 will thus likely change our way of delivering stroke care for years to come. The world should be proactive in how to meet the challenges. The stroke care model may need to adapt, however, so that the care is not compromised and the risk of infection of healthcare providers is minimised. The work group identified five major issues challenging stroke care worldwide.

First, there is an alarming drop of stroke cases presenting to stroke centres and hospitals. Several surveys have reported a decrease

of 10%–30% in stroke cases of all types and a 50% decrease in interventional cases, such as acute thrombectomy.⁴ The latest survey data collected from the Chinese Stroke Center Alliance showed that among 328 hospitals during the period of pandemic, the admission rate of patients who had a stroke decreased by as much as 60%–80%.⁷ The reasons for this drop may include the fear of getting infected by patients who had a stroke and their families; reluctance to bother healthcare providers who are busy taking care of patients with COVID-19; disruption of stroke systems of care due to increased demands for patients with COVID-19; and reductions in stroke incidence due to changes in patterns of behaviour or other factors.⁸

Second is the delay of care due to the need to screen for COVID-19. Hospitals have seen prolonged door-to-treatment time due to the need to rule out COVID-19 and take the precautions. In addition, the ability of a hospital to care for patients who had a stroke may diminish due to the need to minimise exposure and reallocate work force and resources.

The third issue is the possible association of COVID-19 and strokes. Recent reports have suggested that young patients with COVID-19 may be at increased risk of strokes, perhaps due to hypercoagulability related to the virus and particularly among patients with severe COVID-19.^{9,10} In addition, patients with transient ischaemic attack (TIA) or minor stroke who do not seek immediate medical attention are at risk of developing worsening of stroke.

Fourth, healthcare providers, including emergency medical physicians, are being infected at a higher percentage in certain countries, which may decrease the work force providing stroke care.¹¹

Lastly, certain ethnic groups are especially vulnerable to COVID-19 infection, possibly because of lower socioeconomic status and inability to fully practice social distancing,¹² lack of access to healthcare, increased obesity and adverse health behaviours, and medical



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comorbidities, such as diabetes mellitus and hypertension. These groups are also at higher risk of having a stroke.

Realising such challenges, societies such as Chinese Stroke Association, American Heart Association/American Stroke Association and American Academy of Neurology Stroke Section have published their guidance recently.¹³⁻¹⁵ Interventional (Liu LP *et al* under review) and neurointensive care groups have also published their consensus statements.¹⁶ Based on these statements and a need to call for uninterrupted stroke care during this pandemic, this work group has composed the following recommendations:

RECOMMENDATIONS

We believe that during this uncertain time, safe delivery of timely and quality stroke care will require creativity, flexibility and attention to the evolving scientific evidence. As always, our focus should be to meet the needs of patients who had a stroke.

I. Hightened Stroke Education of the Public and Healthcare Professionals

There is a need to raise stroke awareness during this pandemic and to counteract the fear of the population, highlighting that stroke still is a time-dependent emergency. Education should focus on recognition of the signs and symptoms of stroke and the need to go to the hospital since stroke can be lethal. With the report on COVID-19 causing strokes in young, more research is needed to have a better understanding of its underlying mechanism.

As for healthcare professionals, for those treating severe COVID-19 patients who are intubated and sedated and difficult to perform reliable neurological examination, a routine CT of head without contrast to screen for possible strokes may be considered.

II. Consider designating stroke centres as COVID-19 ready stroke centres and allocate resources such as personal protective equipment (PPE) to support these centres. Such designation can be arranged in a way that certified stroke centres can take turns in a city or area if they have many stroke centres in the vicinity.

III. All emergency rooms may consider designating an isolated private area for triage of suspected or confirmed patients with COVID-19 who also have a stroke. This is where all patients who had a stroke presented within the time window for either intravenous thrombolysis or Intracranial thrombectomy should be triaged to.

IV. All TIA patients or patients with confirmed diagnosis of stroke should be tested for COVID-19 if resources allow.

V. All healthcare providers who are treating TIA patients or patients who had a stroke without knowing patients' COVID-19 testing results should don PPE as per local and institutional guidelines to minimise exposure.

VI. At a stroke centre, consider designating one CT, one MRI and one angiography suite to be used for suspected or confirmed COVID-19 patients with stroke.

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REFERENCES

- World Health Organization. Coronavirus Disease (COVID-19) Situation Report - 109, 2020. Available: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports> [Accessed 8 May 2020].
- World Stroke Organization. Learn about stroke. Available: <https://www.world-stroke.org/world-stroke-day-campaign/why-stroke-matters/learn-about-stroke>
- Johnson W, Onuma O, Owolabi M, *et al*. Stroke: a global response is needed. *Bull World Health Organ* 2016;94:634-634A.
- World Stroke Organization. The Global Impact of COVID-19 on Stroke - Survey Report from Prof. Marc Fischer, WSO President-Elect, 2020. Available: www.world-stroke.org/news-and-blog/news/the-global-impact-of-covid-19-on-stroke-survey [Accessed 4 May 2020].
- McNamara D. COVID-19: are acute stroke patients avoiding emergency care? 2020. Available: <https://www.medscape.com/viewarticle/928337> [Accessed 8 Apr 2020].
- Stiepan DD. Why a Mayo clinic expert has concerns about second wave of COVID-19, 2020. Available: <https://newsnetwork.mayoclinic.org/discussion/why-a-mayo-clinic-expert-has-concerns-about-second-wave-of-covid-19/> [Accessed 22 Apr 2020].
- Sampson K. COVID-19: Plummeting stroke admissions and new protocols, 2020. Available: <https://journals.lww.com/neurotodayonline/blog/breakingnews/pages/post.aspx?PostID=945> [Accessed 21 Apr 2020].
- Saad L. Americans worry doctor visits raise COVID-19 risk, 2020. Available: <https://news.gallup.com/poll/307640/americans-worry-doctor-visits-raise-covid-risk.aspx> [Accessed 6 Apr 2020].

- 9 Oxley TJ, Mocco J, Majidi S, *et al*. Large-Vessel stroke as a presenting feature of Covid-19 in the young. *N Engl J Med* 2020:NEJMc2009787.
- 10 Mao L, Jin H, Wang M, *et al*. Neurologic manifestations of hospitalized patients with coronavirus disease 2019 in Wuhan, China. *JAMA Neurol* 2020:e201127.
- 11 CDC COVID-19 Response Team. Characteristics of health Care Personnel with COVID-19-United States, February 12-April 9, 2020. *Weekly/April 17, 2020/69(15):477-481*, 2020. Available: https://www.cdc.gov/mmwr/volumes/69/wr/mm6915e6.htm?s_cid=mm6915e6_w [Accessed 14 Apr 2020].
- 12 CDC. COVID-19 in racial and ethnic minority groups. Available: <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/racial-ethnic-minorities.html>
- 13 Temporary emergency guidance to US stroke centers during the COVID-19 pandemic on behalf of the AHA/ASA stroke Council leadership, 2020. Available: <https://doi.org/10.1161/STROKEAHA.120.9399923> [Accessed 1 Apr 2020].
- 14 Jin H, Hong C, Chen S, *et al*. Consensus for prevention and management of coronavirus disease 2019 (COVID-19) for neurologists. *Stroke Vasc Neurol* 2020:svn-2020-000382.
- 15 Leira EC, Russman AN, Biller J, *et al*. Preserving stroke care during the COVID-19 pandemic: potential issues and solutions. *Neurology* 2020:10.1212/WNL.0000000000009713.
- 16 Nguyen TN, Abdalkader M, Jovin TG, *et al*. Mechanical thrombectomy in the era of the COVID-19 pandemic: emergency preparedness for neuroscience teams: a guidance statement from the Society of vascular and Interventional Neurology. *Stroke* 2020:STROKEAHA120030100.