Global Learning Laboratory
for quality universal health coverage

ACTION BRIEF *

Quality of stroke care during the COVID-19 pandemic in low- and middle-income countries

Professor Jeyaraj D. Pandian, Christian Medical College, Ludhiana, India

JUNE 2022

Background

During the COVID-19 pandemic, there was a significant reduction in the number of stroke patients presenting to hospitals, as well as the number of stroke admissions, rates of thrombolysis and thrombectomies. To accommodate the huge surge of COVID-19 patients, available hospital beds for stroke patients were often reallocated for COVID-19 care. Rehabilitation of stroke patients was also adversely affected.

The stroke systems of care in high-income countries (HICs) were able to rise above these challenges by adapting pre-existent protocols and stroke care workflows, infrastructural reorganization and the implementing pathways for safe evaluation and treatment of stroke patients in a time-sensitive manner.

These learnings can help inform the maintenance of quality stroke care across all countries in the event of future pandemics and are relevant to LMICs that continue facing the pandemic today.

Objective/Goal

This learning brief looks at an adaptation of country protocols and procedures to protect and maintain continuum of quality stroke care (patient beds/care/units) and provide timely emergency treatment.

Keywords

- Stroke
- Health Systems Strengthening
- Myocardial Infarction
- Cerebrovascular Diseases (CVD)
- Resuscitation

Audience

Health care providers, Health administrators, Emergency care personnel

Period covered

May 2020 – October 2021

Key message

Stroke is one of the leading causes of death and disability worldwide with the bulk of the burden being borne by lower- and middle-income countries (LMICs). Management of acute stroke is time-critical and continues to be a priority despite the COVID-19 pandemic. However, the pandemic has posed new challenges to the delivery of stroke care, especially in LMICs where resources are already strained. This brief serves to provide pragmatic recommendations for LMICs to deliver and maintain quality stroke care during a pandemic.

What did you do?

The following measures were introduced to improve people-centered care and preserve the continuum of quality care for stroke patients across several low- and middle-income countries. These included:

- adaptation of pre-existent stroke protocols: new protocols for rapid triaging and risk stratification of stroke patients according to COVID-19 epidemiology and symptoms were written up and implemented, which led to more efficient triaging;
- all suspected stroke patients, irrespective of COVID-19 status, were recommended to undergo neuroimaging, as per protocol, and receive intravenous thrombolysis (IVT) and endovascular treatment (EVT), if deemed eligible;
- dedicated pathways for the transfer of suspected or confirmed COVID-19 positive stroke patients for neuroimaging were established, while patients with large vessel occlusion (LVO) were directly transferred to angiosuites;
- stroke unit (SU) care continued to be offered to stroke patients where possible;
- SU care protocols were modified to limit the frequency of neuro-checks or repetitive saliva swallowing as a measure of modified swallow assessment, as an infection prevention and control measure, and their implementation was encouraged;
- digitalization of stroke care including telestroke, telerehabilitation, and videoconferencing was more widely adopted;
- protected stroke code activation in the emergency department, which meant that irrespective of known or unknown COVID-19 status of the patient, all necessary infection prevention and control precautions for health care workers in contact were mandated, which included the wearing of personal protection equipment (PPE) complete with N-95 masks, limiting the number of personnel in contact, face masks for patients in ED and during transportation;
- mandatory PPE for all health care professionals in contact with stroke patients.

What worked well?

The rapid screening evaluation protocol helped to reduce the delay in stroke evaluation and provide timely care to patients. The adoption of protected stroke code protocols, use of appropriate PPE and minimizing patient contact until definitive COVID-19 risk status assessment, helped maintain the safety of health care professionals while still providing effective care to stroke patients.

The adoption of telemedicine and telerehabilitation were very successful in preserving the continuity of quality stroke care through a virtual medium, while limiting physical contact for health care professionals. Telestroke has wide applications, from helping triage patients requiring EVT to be referred directly to stroke-ready centres, but also managing those with minor strokes in smaller hospitals, to virtual rounds, telerehabilitation and follow-up teleconsultations. This enabled the volume of patients presenting with stroke symptoms to be assessed and treated to the standard of care despite the challenges of infrastructure, personnel and safety, posed by the pandemic.

What did not work so well?

One of the earliest challenges in many settings was the implementation of a separate non-COVID corridor. Due to infrastructural and logistic concerns, both high-risk/positive COVID-19 patients and negative patients had to be transported through the same pathways. The risk of exposure was minimized by several safety adaptations, such as separating transport timings, using appropriate PPE, wearing of a mask by the patient during transit, limiting numbers in these corridors and so on, until measures to provide for separate transit pathways could be implemented.

The initial challenge was emphasizing the importance of a rapid evaluation of stroke patients. There were delays in the emergency department due to lack of clarity in triaging these patients to avoid crowding of patients and spread of infection. Discussions took place with the emergency department and internal medicine staff to come up with a modified protocol in the emergency department so that stroke patients were seen as quickly as possible. The unresolved challenge remains the break in the personal touch by the stroke team while managing COVID-positive stroke patients treated in designated areas. This limited physical contact with stroke care personnel was somewhat compensated for by the use of remote assessment via telemedicine, which helped to maintain patient-centered care.

In the first wave, maintaining adequate safety measures was also challenging. The massive surge of COVID-19 patients overwhelmed the existing health care systems. Insufficient supply of PPE, and inefficient risk assessment measures in the initial wave resulted in many of our rehabilitation staff and health care staff developing COVID.

Impact

In the first months of the COVID-19 pandemic, most countries experienced a drop in the number of stroke admissions, thrombolysis and EVTs. This was reported in multiple large-scale studies from both HICs and LMICs. In a multicentre study from India (comprising 18 hospitals), data was collected for six months from February 2020 to July 2020 and retrospectively from February 2019 to July 2019. A total of 2549 patients were seen in both study periods: 1237 patients (48.53%) in 2019 and 1312 (51.47%) in 2020. Although the overall number of stroke patients and rates of thrombolysis (17% vs 21%) were comparable, a significant decline was observed in the month of April 2020, during the initial period of the pandemic and lockdown. Endovascular treatment reduced significantly (63% vs 36.7%) (3). Similarly, a study from Spain reported a modest decline in stroke admissions (45% vs 40%) thrombolysis (8.2% vs 7.1%) and EVTs (5.2% vs 4.25%) between February-March 2019 and 2020, respectively (6).

However, after the initial challenging period, many steps were taken to adapt to the crisis. Modification of the pre-existing stroke protocols and implementation of protected stroke code improved triaging of the stroke patients leading to reduced delays in evaluation and management. Infrastructural adaptations such as dedicated transit pathways, or direct transfer of patients to angiosuites when required, ensured that rapid reperfusion was accessible to all eligible patients despite the ongoing pandemic. Modified SU care protocols further ensured the continuity of quality stroke care during hospital stays, while maintaining all safety measures for patients and health care workers.

In addition, through digital measures, the continuum of stroke care could be reestablished, especially with regard to follow-up monitoring and rehabilitation. Through these timely interventions, the stroke care pathway was substantially streamlined and stroke care returned to that of the pre-pandemic period. This resulted in restoring stroke admissions, thrombolysis and EVT rates, thereby ensuring the delivery of quality stroke care.

Could this intervention/action be adopted and adapted in other settings?

- Prehospital care: Patients can come by ambulance or by any vehicle without any delay in arrival after symptom onset. This can be easily adapted since this is the usual mode of transport used by stroke patients to reach the hospital in LMICs. If the country has dedicated ambulance services, then they can modify the protocol and take precautionary measures in prehospital care.
- Emergency department: Specific safety measures such as use of protected stroke code, rapid screening and triaging of high-risk patients, mandatory use of PPE by health care staff and triaging of low-risk cases to non-Covid areas are simple interventions which can be adapted in resource-limited settings.
- Neuroimaging: Performing a concurrent CT chest along with neuroimaging (CT Head/CTA) in the protocol, PPE to be worn by all staff, use of minimal staff in the gantry and regular sanitization of the CT scanner after each procedure help maintain the safety of both patient and staff. Most centres in India follow this protocol.
- Thrombolysis and mechanical thrombectomy: thrombolysing in the gantry itself, if possible, use of conscious sedation for thrombectomies, intubation to be done in the emergency department if required, use of minimal staff in the angiosuite and complete sanitization of the angiosuite after each procedure, are measures that can be used to maintain the quality of stroke delivery during a pandemic. The use of Tenecteplase has increased during the pandemic, due to its advantage of bolus administration, thereby limiting contact time spent in the emergency department and also maintaining the timeliness of thrombolytic therapy.

- Stroke unit care: Use of quality improvement tools such as the establishment of written protocols like "Fever, Sugar and Swallow" (FeSS), and modified swallow assessment etc., in addition to limiting the number of staff in stroke units, use of appropriate PPE, and use of telemedicine to monitor COVID-19 positive stroke patients admitted in COVID-19 designated areas can be applied. Telemedicine and stroke workflow Apps are effective measures that support the delivery of quality stroke services.
- Rehabilitation and follow-up: Early involvement of caregivers, follow-up and rehabilitation can be done using telemedicine.
- Digital innovations: Telemedicine has revolutionized stroke care in the pandemic and have helped to maintain the timeliness of the stroke care pathway, particularly for follow-up and rehabilitation.
- COVID-19 vaccine-related vascular complications: Cerebral venous sinus thrombosis (CVST) has been reported as a complication associated with COVID-19 vaccination. Patients presenting with new onset headache and/or focal deficits with history of recent COVID-19 vaccination should be efficiently screened for secondary CVST.
- ·There are reports from LMICs about the occurrence of CVST. However, screening and documentation of CVST is lacking and should be integrated into care pathways. This will enable early identification of CVST patients so that timely therapy can be initiated.

Next steps

Creating awareness of these protocols for maintaining stroke care during COVID-19 is crucial so that health systems can improve their preparedness for future waves of endemicity and continue to deliver quality health services.

Discussion and interaction with the various stakeholders across the health care system about implementing uniform protocols nationally to improve quality of stroke care should take place. The stakeholders involved in stroke care could publish and endorse/recommend implementation of guidelines and the modified stroke protocols described in this brief.

Further information

1. Sylaja PN, Srivastava MP, Shah S, Bhatia R, Khurana D, Sharma A, Pandian JD, Kalia K, Sarmah D, Nair SS, Yavagal DR. The SARS-CoV-2/COVID-19 pandemic and challenges in stroke care in India. Ann N Y Acad Sci. 2020 Aug 1
2. Pandian JD, Panagos PD, Sebastian IA, Sampaio Silva G, Furie KL, Liu L, Owolabi MO, Caso V, Alrukn SA. Maintaining stroke care during the COVID-19 pandemic in lower- and middle-income countries: World Stroke Organization Position Statement endorsed by American Stroke Association and American Heart Association. Int J Stroke. 2022 Jan;17(1):9-17
3. Bhatia R, Sylaja PN, Srivastava MVP, Komakula S, Iype T, Parthasarathy R, Khurana D, Pardasani V, Pamidimukkala V, Kumaravelu S, Pandian J, Kushwaha S, Chowdhury D, Gupta S, Rajendran SP, Reddy R, Roy J, Sharma A, Nambiar V, Rai NK, Upadhyay AD, Parkipandla S, Singh MB, Vibha D, Vishnu VY, Rajan R, Gupta A, Pandit AK, Agarwal A, Gaikwad SB, Garg A, Joseph L, Sreedharan SE, Reddy S, Sreela K, Ramachandran D, George GB, Panicker P, Suresh MK, Gupta V, Ray S, Suri V, Ahuja C, Kajal K, Lal V, Singh RK, Oza H, Halani H, Sanivarapu S, Sahonta R, Duggal A, Dixit P, Kulkarni GB, Taallapalli AVR, Parmar M, Chalasani V, Kashyap M, Misra B, Pachipala S, Yogeesh PM, Salunkhe M, Gupta P; COVID-19 Stroke Study Group (CSSG) India. Clinical profile and outcome of non-COVID strokes during pandemic and the pre pandemic period: COVID-Stroke Study Group (CSSG) India. J Neurol Sci. 2021 Sep 15;428:117583
4. Bhatia R, Sylaja PN, Srivastava MVP, Khurana D, Pandian JD, Suri V, Kumar VGP, Kumaravelu S, Huded V, Surya N, Sharma A, Kaul S. Consensus Statement - Suggested Recommendations for Acute Stroke Management during the COVID-19 Pandemic: Expert Group on Behalf of the Indian Stroke Association. Ann Indian Acad Neurol. 2020 Apr;23(Suppl 1):S15-S23
5. Pandian JD, Kusuma Y, Kiemas LS, Lee TH, Navarro JC, Nilanont Y, Suwanwela NC, Chiu HC, Kwon SU, Tan KS, Thang NH. Stroke Care During the COVID-19 Pandemic: Asian Stroke Advisory Panel Consensus Statement. J. Stroke Med. 2021 Mar 22:25166085211000915
6. Alonso de Leciñana M, Castellanos M, Ayo-Martín Ó, et al. Stroke care during the COVID-19 outbreak in Spain: the experience of Spanish stroke units. Stroke Vasc Neurol 2021 Jun;6(2):267-273. doi: 10.1136/svn-2020-000678
7. Martins SC, Weiss G, Almeida AG, et al. Validation of a smartphone application in the evaluation and treatment of acute stroke in a comprehensive stroke center. Stroke 2020; 51: 240–246.
8.Laver KE, Adey-Wakeling Z, Crotty M, Lannin NA, George S and Sherrington C. Telerehabilitation services for stroke. Cochrane Database Syst Rev 2020; 1:CD010255.