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Nurose Karim MD
East Carolina University Health (ECU Health)

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TELE-STROKE CARE IN PAKISTAN

Nurose Karim[1] **MD**
[1]*East Carolina University Health (ECU Health)*

Correspondence Author: Nurose Karim *East Carolina University Health (ECU Health)* ***Email: nurosekarim@live.com***

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Stroke is a medical and surgical emergency. Every minute in which a large vessel ischemic stroke is untreated, the average patient loses 1.9 million neurons. Every hour in which treatment fails to occur, the brain loses as many neurons as it does in almost 3.6 years of normal aging.[1] This reemphasizes the concept of "time is brain".

Telemedicine is the exchange of medical information from one site to another using electronic communications in an effort to make patient care efficient and more accessible. The concept of telestoke was first introduced in 1990.[2] Since then, it has been modified and revised.

In the system of tele-stroke, there is a central site with remotely based stroke care team that includes a stroke certified physician who can assess an acute stroke patient remotely at a distant site. There is an exchange of medical records and information via video conferencing, video clips, transmission of still images, and electronic health record. This allows faster administration of IV thrombolytics if the patients are eligible and within the window. If a large vessel occlusion (LVO) is identified, tele-stroke allows "drip-and-ship" (administrating IV thrombolytics- "drip" and transferring patient to the nearest comprehensive stroke center- "ship") method for potential thrombectomy.

So far, the concept of Tele-stroke has been utilized extensively in the United States and the author is personally affiliated with nine sister hospitals in the region where she can remotely assess the patient from her primary location and provide acute management.

The estimated annual incidence of stroke in Pakistan is 250/100,000 with stroke related mortality ranging from 11%-30%.[3] The mean age for first stroke in Pakistan is <50 years.[4] This is contrary to US where only 10%-15% of strokes occur in population between age 18-50 years.[5] A million-dollar question is, can we implement tele-stroke system in Pakistan? It seems to be challenging due to the following reasons:
There is a lack of infra-structure for stroke care in Pakistan.[6,7] There are only 10 stroke units throughout the country of which, only 6 institutions offer IV thrombolytics. There is no concept of "Code Stroke" as reaching the time matrices is near-impossible. To discuss briefly how a code stroke works, we need awareness at the level of both, local community and the Emergency Department (ED) physicians to recognize the signs of stroke- BE-FAST (balance, eyes, face, arm, speech and time).[8] Once stroke symptoms are recognized, ED physicians should activate code stroke which activates the on-call stroke physician to immediately come and evaluate the patient and activate CT scanner to clear the room so they can bring this patient. Stroke neurologist then quickly assesses the patient and tries to find the last known normal (the time when the patient was in their usual state of health) and performs a complete National Institutes of Health Stroke Scale (NIHSS). The patient should be transported to the CT scanner immediately and get at the minimum, CT head without contrast to rule out an acute bleed or a large (>2/3 territory stroke). If CT head does not show a bleed and the exam and time of onset are favorable, patient should get IV thrombolytics if they meet the inclusion criteria. Proceeding with this step, they should get a CT angiogram (CTA) of the head and the neck during the same code stroke to rule out LVO. In the real world, code stroke requires a team of ED physician, the triage nurse, the vascular neurologist, a pharmacist and an on-call radiologist reading code stroke images.

The purpose of implementing code stroke is to enroll patients to get timely treatment (thrombolytics and mechanical thrombectomy). This brings us to the same concern, the constraints of timely treatment. How many institutes have IV thrombolytics administration capability? Can it be set up in the public and country hospitals where it can be given to the patients free-of-cost so money should not hinder patient care? These same public hospitals need 24/7 stroke coverage 7 days a week, with no downtime operating CT scanner and with an on-site radiologist available all the time. If we can get these two things covered, then implementing tele-stroke make sense. The tele-stroke will allow a physician off-site to immediately evaluate the patient on camera and perform NIHSS. They should also be able to view

images in the same set-up and give recommendations to administer IV thrombolytics. If the CTA shows an LVO, the stroke neurologist and the on-call neurointerventionalist should discuss the patient and apply the concept of 'drip and ship' and bring the patient over to the closest thrombectomy capable center. Since there are only handful of vascular neurologist in Pakistan, tele-stroke would allow more patients to receive acute management without a significant delay. The tertiary hospitals' Emergency Department should have a basic set-up where they are in communication with the off-site Stroke Neurologist on-call at the comprehensive stroke center. These EDs should have a basic training of procedures for initiating a code stroke and tele-stroke consultation, tele-medicine technology platforms, and stroke clinical protocols. They should have IV thrombolytics available and training to administer them on the recommendations of the stroke neurologist.

Legal and economic parameters must be established for telemedicine including reimbursement, liability, malpractice insurance, licensing, and credentialing. There should be policies to protect patients' privacy and confidentiality.

In a nut-shell, the concept of tele-stroke is attractive but it is practical only if the medical (IV thrombolytics) and surgical (mechanical thrombectomy) intervention is made accessible to the general population.

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