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Carissa C. Pineda MD

Thomas Jefferson University, carissa.pineda@jefferson.edu

Jeanne Birch RN, BSN

Thomas Jefferson University, jeannee.birch@jefferson.edu

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Primary Stroke Centers: Their Role and Impact on Acute Stroke Management

Carissa C. Pineda MD¹ and Jeannee Birch RN, BSN²

Department of ¹Neurology and ²Department of Performance Improvement, Thomas Jefferson University, Philadelphia, Pennsylvania

The management of acute ischemic stroke has been recognized as a significant medical problem. Stroke remains to be the third leading cause of death and the leading cause of long-term disability; 80% of all strokes are ischemic (a blood clot disrupts blood flow), and the rest are hemorrhagic (a blood vessel ruptures in the brain). Nearly 1 in 15 deaths in 2003 were the result of a stroke.¹ Approximately 750,000 new strokes occur annually, of which 250,000 result in the deaths in the United States alone. The latest estimates for stroke costs total to about \$30 billion in direct costs, and \$20 billion are in indirect costs.² If nothing is done about this disease, the annual incidence of strokes is expected to reach 1.1 million by the year 2015.

Despite recent advances in its diagnosis and treatment, a population of the general public still have difficulty recognizing stroke symptoms, and are unaware that stroke is indeed a medical emergency.³ The two major causes of delay in treatment are mainly failure to appropriately recognize the symptoms that indicate stroke (numbness, dizziness, confusion, or headache), and failure to access a medical facility that is equipped to handle acute strokes. In an effort to raise awareness, and the level of care provided to stroke patients, stroke center standards were created and hospitals that met the strict criteria were then selected. However, many hospitals do not have the necessary infrastructure and organization needed to triage and treat patients with stroke rapidly and efficiently.⁴

Seeing that the model of trauma centers were effective both in the rural and urban settings, the concept of acute stroke centers were then explored. The Brain Attack Coalition, which is a multidisciplinary group involved in stroke care, set out to establish guidelines for stroke centers. The role of a *Primary Stroke Center* is to be able to stabilize and provide emergency care for the acute stroke patients. Depending on the complexity of the case, they would either admit the patient, or transfer them to a comprehensive stroke center. On the other hand, the *Comprehensive Stroke Center* should be able to provide complete care to any complex patient; they should have the necessary infrastructure, both in personnel and equipment.

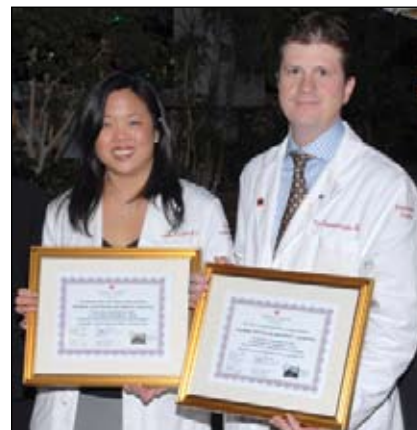
The main goals and benefits of a certified stroke center are the following:

- Improve the efficiency of patient care
- Provide access to the most up to date stroke therapies, which ultimately will lead to fewer peristroke complications
- Increase the number of patients discharged home than to skilled nursing facilities
- Decrease the length of hospital stay.

By accomplishing all of the above, the cost to the healthcare system will be reduced, and hopefully, patient satisfaction should also increase.

Although advances in stroke treatment have moved forward over the past years, the main limitation remains to be the prompt and proper treatment. Thrombolytic therapy, which has been FDA approved for over 10 years now remains to be the mainstay of acute treatment, however, only about 3% of patients with acute strokes are being treated. Another important goal of stroke centers is to provide access to these acute therapies.

The Brain Attack Coalition and American Stroke association have developed a framework of requirements needed to establish a Primary Stroke Center. These elements are based on the use of standardized method of delivering evidence based clinical care with known improvement of patient outcome. The Joint Commission has recognized the effectiveness of these measures and has based their criteria for Primary Stroke Center Certification on the recommendations listed in the accompanying table.⁶⁻⁸



Drs. Erol Veznedaroglu (Neurosurgery) and Carissa Pineda (Neurology) with the Gold and Silver Performance Awards from the American Heart Association for maintained high standards in care and management of stroke patients.

In this decade, the integration of multidisciplinary approach in the treatment of strokes will occur within the structure of a stroke center. Establishing a Stroke Center requires coordination of efforts throughout the Health System. Even hospitals with limited resources can positively impact the outcome of a stroke patient. Smaller healthcare centers can develop a “Stroke Network” with larger healthcare centers to provide comprehensive care. The most crucial component of stroke care is time—“Lost time equals lost brain” is the slogan, as brain damage progresses the blood flow is cut off. Rapid evaluation and referral with “Treat and Transfer” protocols can be established at any hospital that has the ability to provide Emergency Services. With new therapies emerging for stroke treatment, this could significantly impact all patients having access to cutting edge stroke care.

The American Heart Association’s Performance Awards for hospitals is based on 85% compliance for patients in each of the following

items. The Silver Award is given to institutions who meet goals for 12 months and the Gold Award, for 24 months.

- Percent of acute ischemic stroke patients who arrive at the ED within 120 minutes (two hours) of onset of stroke symptoms who receive IV t-PA within 180 minutes (three hours) of onset of stroke symptoms
- Percent of ischemic stroke or TIA patients who receive antithrombotic medication within 48 hours of hospitalization

- Percent of ischemic stroke or TIA patients discharged on antithrombotics (e.g., warfarin, aspirin, other antiplatelet drug)
- Percent of ischemic stroke or TIA patients with atrial fibrillation who are discharged on anticoagulation therapy (warfarin/Coumadin or heparin/heparinoids) unless an absolute or relative contraindication exists
- Percent of patients at risk for DVT who received DVT prophylaxis by the second hospital day

- Percent of ischemic stroke or TIA patients with LDL \geq 100 mg/dL OR on cholesterol reducer prior to admission who are discharged on cholesterol reducing drugs
- Percent of smokers who receive smoking cessation advice or medication (e.g., Nicoderm or Zyban) at discharge

These steps are all based on published evidence assessing modifiable risk factors which affect the likelihood of stroke.^{9, 10} Any one of these risk factors can double the chance of a stroke recurring.

Acute Stroke Team

This is composed of physicians and health care professionals with experience and proper training in management of acute strokes. They should be available 24 hrs a day to evaluate patients with symptoms suggestive of an acute stroke. The institution should have a Stroke notification system in place with documented expected response times.

Written Care Protocols

One of the major key elements in developing good outcomes is through the implementation of protocols. As such, protocols should be based on well established Standards of Care and national guidelines. This should include emergency care of ischemic/hemorrhagic stroke patients. Studies have shown that by adhering to protocol guidelines, more patients were properly screened for tPA. Not only was there a substantial increase in the proportion of patients receiving thrombolytic therapy, but rather, there was also a decrease in the rates of symptomatic ICH.⁵ If the patient is deemed to be complex, a protocol should be in place for those requiring transfers to a comprehensive center—a “Treat and Transfer” pathway should be initiated.

Emergency Department

The ED serves as the gateway between the patient and the hospital. It is important that emergency personnel are trained in recognizing, diagnosing, and treating all types of acute stroke. There should be highly organized means communication amongst the EMS, ED personnel and the Acute Stroke Team. The ED should be able to provide proper documentation of patient’s history, procedures, and qualifications for thrombolytic therapy.

Stroke Unit

This is a dedicated unit staffed by health care personnel (vascular neurologists, stroke-trained nurses, physical/occupational/speech therapists, case managers, social workers) who are trained to care for patients with cerebrovascular diseases. This unit should also be equipped with infrastructure such as continuous telemetry, and the capability for blood pressure monitoring. There has been a big difference noted in the care received by stroke patients in the stroke unit setting as compared to the general medical floors. Patients in stroke units had an 8% reduction in length of stay, and 7% increase in going back to living at home, and a 17% reduction in death rates. The cost of forming and operating stroke units will vary depending on size and location. Again, there is a need for written care protocols for standardization of care.

Neurosurgery

During the acute phase of a stroke, patients may need a neurosurgical procedure, thus, a primary stroke center must be able to provide neurosurgical care within 2 hours if clinically necessary. If this is not met, the patient should be transferred to a medical facility with an available neurosurgeon who is experienced in treating different types of acute strokes. A protocol is necessary to Treat and Transfer patients with the need for comprehensive stroke care.

Neuroimaging

In order to have a proper stroke diagnosis, it is vital for a primary stroke center to have imaging capability 24 hours a day. The ideal door to imaging time is within 25 minutes of order entry, and must be interpreted within 20 minutes.

Hospital and Administrative Support

There should be a designated Medical Director of Stroke Center with expertise and training in Cerebrovascular Diseases. Commitment from administration of hospital/health system is important in providing support and funding for the needed resources to maintain the ability to deliver high quality and efficient care to acute stroke patients and the community.

Laboratory Services

This should be available 24 hrs. a day (CBC, Chemistry and Coagulation studies) The chest x-ray and EKG must be completed within 45 minutes of patient’s arrival

Outcome/Performance Improvement:

Primary Stroke Centers must be able to develop specific stroke performance measures to be monitored by Performance Improvement Department, there should be ongoing efforts with Stroke Team and Performance Improvement to improve stroke care by utilizing benchmarking and performance measures data

Educational Programs

In order to keep up with new developments in stroke care, the stroke team professional staff is required to maintain 8 hours CME (or its equivalent) credits per year. In addition to this, the stroke center should be able to offer education to the community at least twice a year in relation to Stroke recognition, prevention, and treatment.

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