

Guidelines for the ESTABLISHMENT and OPERATION of STROKE UNITS

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I. THE STROKE CENTER

A. Major Aspects of Acute Stroke Care in Stroke Center

1. **Acute Stroke Teams:** Hospital-based stroke teams should be available round-the-clock, seven days a week in order to evaluate within 15 minutes any patient who may have suffered a stroke.
2. **Written Care Protocols:** The availability of written protocols is key in reducing time to treatment and treatment complications.
3. **Emergency Medical Services:** Emergency medical services (EMS) are vital in the rapid transport and survival of stroke patients.
4. **Emergency Department:** The emergency department staff should be trained in diagnosing and treating stroke and have good lines of communication with both EMS and the acute stroke team.
5. **Stroke Unit:** Where patients can receive specialized monitoring and care.
6. **Neurosurgical Services:** These should be provided to stroke patients within two hours of when the services are deemed necessary.
7. **Support of the Medical Organization:** The facility and its staff, including administration, should be committed to the Stroke Unit
8. **Neuroimaging:** There must be capability to perform an imaging study within 25 minutes of the physician's order. A physician should evaluate the image within 20 minutes of completion.
9. **Laboratory Services:** Standard laboratory services should be available round-the-clock, seven days per week at a Primary Stroke Center.
10. **Outcomes/Quality Improvement:** Primary Stroke Centers should have a database or registry for tracking the type and number of stroke patients seen, their treatments, timelines for treatments, and some measurements of patient outcome.
11. **Educational Programs:** The professional staff should receive at least eight hours per year of continuing medical education credits. In addition to professional education, the Stroke Center should plan and implement at least two annual programs to educate the public about stroke prevention, diagnosis and availability for emergency treatment.

B. Definition of a Stroke Unit

A Stroke Unit is a hospital unit that cares for stroke patients exclusively or almost exclusively, with specially trained staff and a multidisciplinary approach to treatment and care.¹

C. Characteristics of a Stroke Unit

Organization

- Coordinated multidisciplinary team care
- Nursing integration with multidisciplinary care

- Involvement of caregivers in rehabilitation process

Specialization

- Medical and nursing interest
- Expertise in stroke and rehabilitation

Education

- Education and training program for staff, patients and caregivers

D. Goals of a Stroke Unit

1. Improve chances of survival
2. Reduce disability
3. Shorten length of hospital stay
4. Shorten length of rehabilitation

E. Types of Stroke Units

E1. Acute Admission Units:

1. Intensive Care Units – dedicated stroke unit with facilities such as ventilators and intensive invasive and non-invasive monitoring equipment. The units focus on the very acute care for a selected group of acute stroke patients and have little or no focus on rehabilitation.

2. Acute stroke unit – dedicated stroke units that accept patients acutely but discharge them early (within 7 days) and have no or at best a modest focus on rehabilitation. The units usually do not have intensive care facilities, but usually have facilities for non-invasive monitoring of vital signs.

3. Combined acute/rehabilitation stroke unit – dedicated stroke units which accept stroke patients acutely for acute treatment combined with early mobilization and rehabilitation for an average period of at least one to two weeks.

4. Mixed acute units – units that treat stroke patients and patients with other diagnoses. The units accept patients acutely. Some have a program of care similar to acute stroke units while others have a program similar to a combined unit.

E2. Delayed admission unit

1. Rehabilitation stroke unit – dedicated units that accept patients after a minimum delay of seven days after stroke onset. The units focus on rehabilitation.

2. Mixed assessment/rehabilitation unit – wards or units which have an interest and expertise in the assessment and rehabilitation of disabling illness, but do not exclusively manage stroke patients.

E. Effects of Stroke Unit Care on Recovery

Analysis on Cochrane Data Base involving 23 trials showed significant reduction of death (OR; 0.88), death or dependency (OR; 0.75) and death or institutionalization (OR; 0.77) when patients were treated in a stroke unit compared with those treated in general wards.²

Two trials evaluated the long-term effects of stroke unit care. On the 5-year follow-up, admission in combined acute/rehabilitation stroke units reduced death (OR; 0.59, NNT=9), death or dependency (OR; 0.36, NNT=6) and death or institutionalization (OR; 0.48, NNT=9). Ten-year follow-up of patients admitted in combined acute/rehabilitation stroke units similarly showed a reduction in death (OR; 0.45), death or dependency (OR; 0.45) and death or institutionalization (OR;0.42).³⁻⁵

Patients admitted in a rehabilitation stroke unit even after a minimum delay of seven days post-stroke resulted in reduced death (OR; 0.66, NNT=10) and death or dependency (OR; 0.83, NNT=90).⁶

The stroke unit benefits stroke patients of both sexes, all ages, and those with mild, moderate or severe strokes.^{2,7}

Comparing the different stroke unit models, the unit with the strongest evidence of benefit is the combined acute/rehabilitation stroke-unit model, and to some extent the dedicated rehabilitation stroke unit.²

II. STROKE UNIT ORGANIZATION

A. The Stroke Unit:

Basic Equipment:

1. 4 to 8 beds
2. Cranial computerized tomography (available 24 hours)
3. Angiography (available 24 hours)
4. Ultrasound (continuous-wave, TC Duplex, transthoracic echocardiogram; transesophageal echocardiogram)
5. Monitoring (RR, Respiration, Holter, O₂ saturation)
6. Emergency laboratory

Monitoring:

1. Basic – Holter, blood pressure, O₂ saturation, respiration, temperature
2. Special – Transcranial Doppler, embolus detection, electroencephalography, central breathing patterns (sleep apnea)

B. Tasks

1. Admission within the unstable phase (in general, <24 hours)
2. Monitoring of vital and neurological parameters
3. Immediate diagnosis (etiology, pathogenesis)
4. Immediate treatment and secondary prevention
5. In general, length of stay not longer than seven days

C. Patient Selection

1. Indications for Admission to the Stroke Unit
 - a. Acute stroke (< 24 hours)
 - b. Awake, somnolent patient
 - c. Symptoms fluctuating or progressive
 - d. TIAs with high stroke risk (non-valvular AF, stenosis)
 - e. Vital parameters unstable
 - f. Thrombolysis, Anticoagulation
 - g. New investigational treatment or procedure
2. Admission to Acute Stroke Unit Not Indicated
 - a. Patients with severe consciousness impairment (should be admitted to intensive care unit instead)
 - b. Severely disabled patients by previous strokes
 - c. Very old patients or those with multiple comorbidities
3. Patients with the following should be admitted to the intensive care unit instead of the acute stroke unit:
 - a. Stupor and coma
 - b. Central respiratory disorders requiring artificial ventilation
 - c. Space-occupying cerebral infarctions with risk of herniation
 - d. Severe cardiopulmonary insufficiency
 - e. Hypertensive-hypervolemic treatment

A. The Stroke Team

1. Personnel
 - a. Medical doctors
 - b. Nurses
 - c. Physiatrists
 - d. Occupational therapists
 - e. Speech pathologist
 - f. Nutritionists
 - g. Social workers
2. Personnel with special interest in stroke are medical doctors or other paramedical people who:
 - a. Have undergone continuing education on stroke and other related activities or subspecialties on stroke
 - b. Have been attending at least one national or international meeting on stroke in a year
 - c. Have undergone stroke fellowship or preceptorship training on stroke
 - d. Is a member or officer of a national or international organization devoted to stroke

III. HOSPITALS IN THE PHILIPPINES WITH ACUTE STROKE UNITS

Table 11.

Hospitals	Stroke Unit Type	Contact Number
Metro Manila		
East Avenue Medical Center	Mixed acute units	9280611 loc.503
Jose Reyes Memorial Medical Center	ASU	7119491 loc 262
Makati Medical Center	ASU	
Manila Adventist Medical Center	Mixed acute units	5259191 loc 324
Manila Doctors Hospital	ASU	5243011
Manila Central University	Mixed acute units	3672031 loc 1127
Philippine General Hospital	ASU	5218450 loc 2406
Philippine Heart Center	Mixed acute units	9252401 loc 2483
San Juan de Dios Medical Center	Mixed acute units	8319731 loc 1226
St. Luke's Medical Center	ASU	7230101 loc 7399
Sto. Tomas University Hospital	ASU	7313001 loc 2368
The Medical City	Mixed acute units	6356789 loc 6281
Luzon		
Mt. Carmel Diocesan General Hospital, Lucena	Mixed acute units	042-7102576
Lorma Medical Center, San Fernando, La Union	Mixed acute units	072-700-0000
Lucena United Doctors Hospital	ASU	042-3736161
Cebu		
Cebu Doctors Hospital	ASU	032-2555555
Chong Hua Hospital	Mixed acute units	032-2541461

ASU, acute stroke unit.

IV. RECOMMENDATIONS

Stroke patients should be treated in stroke units (Level I). Admission to stroke unit decreases death, dependency and institutionalization.

Stroke units should provide coordinated multidisciplinary care provided by medical, nursing and therapy staff who specialize in stroke care (Level I).

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