

# AN ABRIDGED GUIDELINE FOR ACUTE STROKE MANAGEMENT

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Stroke is one of the most prevalent and disabling disease in human being. Approximately 700000 strokes occur each year in the United States, leaving 500 000 stroke survivors with disability, and economic loss resulting from stroke approaches an estimated \$51.2 billion annually <sup>1</sup>. What comes below is stroke management guideline used at Massachusetts General Hospital (at Harvard medical school) in year 2005 <sup>2</sup>. This presentation is an abridged form of the proposed guideline. At the end, some comments and recommendations are presented regarding acute stroke management in Iran.

## **Acute stroke management:**

When a patient is referred to an emergency department with signs and symptoms which are suggesting of stroke (such as aphasia, decreased level of consciousness, hemiparesis), these work up and practices should be done:

- 1- After taking a brief history and physical examination, an EKG and Chest X ray should get obtained and routine lab tests be asked for the patient.
- 2- Brain CT or MRI should be asked for the patient.
- 3- CT Angiography (CTA)/MR Angiography (MRA) or carotid ultrasound/Trans Cranial Doppler Sonography should be considered for the patient to evaluate large cerebral vessel patency.
- 4- If less than 12 hours have been passed since the start of the problem, Acute Stroke Team should be paged.

After the above steps, ischemic strokes could be differentiated from its differential diagnoses such as brain hemorrhages (such as Intra Cerebral hemorrhage (ICH), Sub Dural hemorrhage (SDH)) tumors, Migraine and seizure. If ischemic stroke was highlighted as the patient

diagnosis these steps should be followed:

- 1- If less than 3 hours have been passed since symptom onset **and** no large vessel occlusion is detected by CTA/MRA, intravenous tissue Plasminogen Activator iv-tPA should be administered (with consideration of its contraindications).
- 2- If less than 6 hours have been passed since symptom onset when symptoms are related to carotid territory strokes or less than 12 hours have been passed when symptoms are related to basilar territory strokes, **and** large vessel occlusion is detected by CTA/MRA, Intra arterial thrombolysis should be done for the patient (with consideration of its contraindications).
- 3- The stroke pathophysiology should be confirmed by the following histories, physical exams, tests and procedures. These pathophysiologies are thromboembolic, Lacunar, large Vessel stenosis/occlusion and other mechanisms.

## **ThromboEmbolic Stroke:**

### ***Diagnostic Criteria:***

- 1- Features suggestive of embolization may include:
  - a. Sudden onset of symptoms, with severity maximal at onset.
  - b. In the lenticulostriate or thalamogeniculate territories, lesions greater than 1 cm should raise suspicion of embolism
  - c. Cerebellar hemispheric infarction
  - d. The identification of a possible embolic source (e.g. left atrial or ventricular thrombus, atrial myxoma, atrial fibrillation, valvular disease, cardiomyopathy with ejection fraction <25% or acute myocardial infarction ...).
- 2- Brain imaging consistent with embolic disease.

After confirmation of thromboembolization as the presumed pathophysiologic process, heparin should get started for the patient unless contraindicated (such as infective endocarditis). A number of tests and procedures should be

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considered for the patient such as transthoracic echocardiography with agitated saline, transesophageal echocardiography with agitated saline, hypercoagulable tests, 24-hour holter monitoring,...

Consider induced hypertension to determine if symptoms can be ameliorated with augmented Cerebral Blood Flow (CBF). Patients with patent circle of Willis by CTA or MRA may not benefit from induced hypertension and may be at greater risk of ICH. Also, consider neurosurgical consultation for cerebellar infarction which are at greater risk for brainstem compression or hydrocephalus.

### **Lacunar Stroke:**

#### ***Diagnostic Criteria:***

- 1- There are some well defined clinical syndromes which are indicative of lacunar infarcts such as pure motor hemiparesis, pure sensory loss, dysarthria-clumsy hand syndrome, ataxia-hemiparesis syndrome.
- 2- All the patients should undergo procedures such as CTA/MRA, ultrasound or Angiography to establish large vessel patency.
- 3- Recognized risk factors for small vessel occlusive disease such as chronic hypertension, Diabetes Mellitus, smoking, hyperlipidemia.
- 4- Brain imaging consistent with small vessel occlusive disease.

Because this group of patients have a favorable outcome in comparison with other groups, thrombolytic drugs could be avoided in this group. Antiplatelet drugs should be administered for the patients (e.g., aspirin, clopidogrel, ticlopidine, Dipyridamole). For fluctuating symptoms, IV heparin could be considered.

### **Large Vessel Stroke:**

#### ***Diagnostic Criteria:***

Large artery occlusion is divided into disorders of the anterior (internal carotid artery and branches) and posterior (vertebrobasilar arteries and branches) circulation:

- 1- Middle cerebral artery (MCA) occlusion is characterized by weakness of the contralateral face, arm and leg with hemianopsia and a preference of the eyes and head toward the side of the involved hemisphere.
- 2- Anterior cerebral artery (ACA) occlusion is much rarer, and causes isolated

weakness of the lower limb. If both ACAs are affected a generalized decrease in initiative (abulia) may occur. Border Zone or watershed infarction is the result of insufficient blood flow to distal territories of the major cerebral vessels. This develops most commonly in the setting of severe, sustained hypotension (e.g., cardiac arrest) or in the presence of severe atherosclerotic narrowing of the carotid arteries. The classic presentation is proximal arm/leg weakness with preservation of distal strength, the so-called "man in a barrel."

- 3- Internal carotid artery (ICA) stenosis or occlusion presents with features of both ACA and MCA ischemia, as outlined above.
- 4- Posterior Circulation infarction involves the brainstem, cerebellum, thalamus and occipital lobes. As a result patients can present with bilateral limb weakness or sensory disturbance, cranial nerve deficits, ataxia, nausea and vomiting, or coma.
- 5- Brain imaging with infarction in the territory of a large vessel.

If Large Vessel Stroke was confirmed as the presumed pathophysiologic process, anticoagulation with heparin should get started for the patient.

Consider induced hypertension to determine if symptoms can be ameliorated with augmented Cerebral Blood Flow (CBF). Avoid sustained hypertension (SBP>180 after day 1) in patients with large infarcts and no Blood Pressure symptom threshold.

Consider extracranial carotid angioplasty, stenting or endarterectomy in those with TIA or minor strokes and high-grade stenosis (but not internal carotid artery (ICA) occlusion). Also, Consider intracranial angioplasty or stenting of carotid, MCA or basilar arteries in patients failing maximal medical therapy.

### **Stroke due to Other Mechanisms:**

These mechanisms are consisted of Arterial Dissection, Cerebral Venous Sinus Thrombosis, Hypercoagulability and hematological disorders. The management of stroke in these disorders is influenced somehow by the presumed pathophysiologic mechanism.

### ***Some comments and recommendations:***

- 1- Although in this guideline it is recommended to use anticoagulation in large vessel strokes but this is not accepted by all authors. It has not been shown that administration of heparin within 48 hours of symptom onset results in a decrease in morbidity/mortality of stroke patients or a decrease in stroke recurrence rate <sup>3</sup>.
- 2-Antiplatelet drugs which are available commercially in Iran are Aspirin, Ticlopidine, Clopidogrel and Dipyridamole. Ticlopidine was not superior to aspirin in reduction of stroke mortality/morbidity or stroke recurrence rate <sup>4</sup>. In contrast, Clopidogrel has been shown to be superior to aspirin in reduction of above outcomes <sup>5</sup>. But combination of Dipyridamole with aspirin has been shown to be more effective than aspirin or Dipyridamole alone in diminution of above mentioned outcomes <sup>6</sup>. No completed clinical trial has been published comparing Clopidogrel with aspirin and Dipyridamole. Therefore, as Clopidogrel is expensive in Iran, it could be recommended to prescribe aspirin plus Dipyridamole as first-choice antiplatelet regimen for Iranian stroke patients unless contraindicated.
- 3- It seems that current stroke management in our country is out of dated and needs revolutions. These are some of the changes which seem obligatory: Provision of CT to diagnose stroke in less than 3 hours since symptom onset, provision of iv-tPA for stroke patients, provision of CTA/MRA

for stroke patients during the first hours after stroke onset, provision of facilities to do carotid/basilar angioplasty/stenting for stroke patients in emergency departments and practice of hemispherectomy for refractory cerebral edema due to stroke.

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