

ACUTE ISCHEMIC STROKE WORK-UP

Time is brain . . . every minute counts.

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JULY 29, 2008

Stroke Demographics

- #1 cause of neurologic hospital admissions
- #1 cause of serious, long term disability
- #3 cause of death in the U.S.
- #2 cause of death worldwide
- #800,000 new strokes per year in the U.S.
- \$65.5 Billion- est. 2008 cost of stroke in U.S.

Time is brain . . . every minute counts.

Stroke Demographics

80-85% of all strokes are ischemic

- 1/3 are large artery thrombosis
- 1/3 are cardioembolic
- 1/4 are lacunar

ACUTE ISCHEMIC STROKE CARE

- Community Awareness
- Pre-hospital management
- Emergency evaluation and diagnosis
- General acute treatment, including hypertension
- Thrombolytics and endovascular intervention
- Anticoagulants/antiplatelets
- Treatment of acute neurological complications

Time is brain . . . every minute counts.

ACUTE ISCHEMIC STROKE CARE

Community Awareness-

The logo for 'Give Me 5' is displayed in a white, rounded rectangular box. The text 'give me 5' is written in a bold, sans-serif font, slanted upwards from left to right. The word 'give' is in white, 'me' is in white, and the number '5' is in red. The entire logo is set against a black background within the box.

“Give Me 5” is a quick stroke check:

WALK (Is their balance off?)

TALK (Is their speech slurred or face droopy?)

REACH (Is one side weak or numb?)

SEE (Is their vision all or partly lost?)

FEEL (Is their headache severe?)

■ Video

<http://www.youtube.com/watch?v=LQK4439pdK0>

Implementation Strategies for Emergency Medical Services Within Stroke Systems of Care

A Policy Statement From the American Heart Association/ American Stroke Association Expert Panel on Emergency Medical Services Systems and the Stroke Council

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Stroke remains the third leading cause of death and a leading cause of long-term disability among Americans, despite advances in stroke prevention, diagnosis, treatment, and rehabilitation. Approximately 700 000 individuals suffer a new or recurrent stroke each year.¹ Advances over the past decade in acute stroke care, including the introduction of fibrinolytic and other short-term therapies, have highlighted the critical roles of emergency medical services (EMS) agencies and emergency medical services systems (EMSS) in optimizing stroke care.²⁻⁷

In this context, the term "EMS" refers to the full scope of prehospital services necessary for the acute care of patients with stroke, including 9-1-1 activation and dispatch, emergency medical response, triage and stabilization in the field, and transport by ground or air ambulance to a hospital or between facilities.

The term "EMSS" refers to the delivery systems for EMS that may be organized on a local, regional, statewide, or nationwide basis.⁸ EMSS involves the organization of public and private resources for the delivery of emergency medical care. These systems include the community, emergency medical and healthcare personnel, public safety agencies, emergency facilities, and critical care units. The dissemination of public information and education, provision of professional training, and development of disaster planning and standardized record keeping also are key elements of EMSS. Additionally, EMSS must address issues related to commu-

nication, transportation, access to care, patient transfer, mutual aid (the sharing of resources across EMSS), and system review and evaluation.⁹ The successful integration of one (and often multiple) EMSS is critical to ensuring the effectiveness of a stroke system of care.

The American Stroke Association (ASA), a division of the American Heart Association (AHA), is dedicated to improving stroke prevention, treatment, and rehabilitation through research, education, advocacy, and the development of scientifically based standards and guidelines. In 2004, the ASA convened a multidisciplinary task force on the development of stroke systems (2004 Task Force). The 2004 Task Force found that the fragmented approach to care that exists in many regions of the United States is a significant obstacle to reducing the morbidity and mortality attributable to stroke. To address this fragmentation in care, the 2004 Task Force recommended the establishment of stroke systems of care and identified the activation and response of EMS as one of the 7 critical components of effective stroke systems of care.¹⁰

In 2006, the ASA convened a multidisciplinary group, the ASA's Expert Panel on Emergency Medical Services, to examine in greater detail the 2004 Task Force's recommendations involving EMSS. In this article, the Expert Panel examines the challenges associated with integrating EMS activation and response within stroke systems of care and identifies both performance measures and resources to ad-

EMS STROKE STRATEGIES

- Locate acute stroke patients thru W-E 911
- Identify acute stroke patients rapidly by training of EMS communicators to recognize stroke symptoms
- Dispatch highest level of EMS response as appropriate
- Rapid on-scene diagnosis of stroke victim thru use of validated screening algorithms
- Establish goals for EMS response and transport times for acute stroke patients
- Develop pre-established referral processes and interfacility transfer agreements

Time is brain . . . every minute counts.

PREHOSPITAL MANAGEMENT

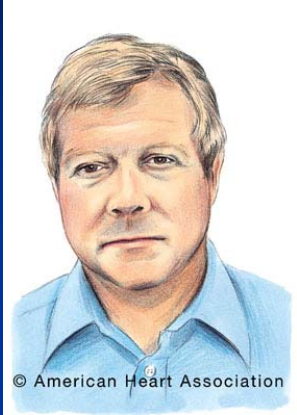
Guidelines for EMS Management of Patients with Suspected Stroke:

- Manage ABCs
- Cardiac monitoring
- Intravenous access (avoid hypotonic fluids)
- Oxygen (O₂ sat <92%)
- Assess for hypoglycemia
- NPO
- Perform stroke screening evaluation
- Alert receiving ED
- Rapid transport to closest appropriate facility capable of treating acute stroke

Not Recommended:

- Dextrose-containing fluids in non-hypoglycemic patients
- Excessive blood pressure reduction
- Excessive IV fluids

CINCINNATI STROKE SCALE



Facial Droop

- *Normal:* Both sides of face move equally
- *Abnormal:* One side of face does not move at all



Arm Drift

- *Normal:* Both arms move equally or not at all
- *Abnormal:* One arm drifts compared to the other

Speech

- *Normal:* Patient uses correct words with no slurring
- *Abnormal:* Slurred or inappropriate words or mute

PREHOSPITAL MANAGEMENT

- EMS use strongly associated with :
 1. shorter time periods from symptom onset to hospital arrival
 2. decreased time to initial physician examination, initial CT imaging, and neurological evaluation.
 3. majority of patients who receive t-PA.



STROKE AWARENESS

■ Video

http://www.ted.com/index.php/talks/jill_bolte_taylor_s_powerful_stroke_of_insight.html



Saint Mary's
HOSPITAL

Emergency

Trauma Center



Helipad

STROKE PROTOCOL

- Triage nurse identifies and appropriately triages patient to monitored treatment area.
- ED physician makes rapid determination if patient meets Stroke Alert criteria (Goal- 10 minutes from arrival)
- Simultaneously, Stroke Alert is called, lab work sent, NIHSS is performed and patient is sent to CT scan (Goal- CT is done within 25 minutes of order).
- Patient returns, CT is officially read, lab results reviewed, NIHSS is repeated, Stroke team consults Neurology, t-PA indication/contraindications sheet is filled out, informed consent is given, and patient receives t-PA (Goal- within one hour of arrival).

Time is brain . . . every minute counts.


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NIH STROKE SCALE

Category	Description	Score
1a. Level of consciousness (Alert, drowsy, etc.)	Alert	4 <input type="checkbox"/>
	Drowsy	3 <input type="checkbox"/>
	Stuporous	2 <input type="checkbox"/>
	Coma	1 <input type="checkbox"/>
1b. LOC Questions (Month, age)	Answers both correctly	0 <input type="checkbox"/>
	Answers one correctly	1 <input type="checkbox"/>
	Both incorrect	2 <input type="checkbox"/>
1c. LOC Commands (Open, close eyes; make fist, let go)	Obeys both correctly	0 <input type="checkbox"/>
	Obeys one correctly	1 <input type="checkbox"/>
	Both incorrect	2 <input type="checkbox"/>
2. Best Gaze (Eyes open; follow fingers or face)	Normal	0 <input type="checkbox"/>
	Partial gaze palsy	1 <input type="checkbox"/>
	Forced deviation	2 <input type="checkbox"/>
3. Visual (Introduce visual stimulus, patient's visual field quadrants)	No visual loss	0 <input type="checkbox"/>
	Partial hemianopia	1 <input type="checkbox"/>
	Complete hemianopia	2 <input type="checkbox"/>
	Bilateral hemianopia	3 <input type="checkbox"/>
4. Facial Palsy (Show teeth; raise eyebrows and squeeze eyes shut)	Normal	0 <input type="checkbox"/>
	Minor	1 <input type="checkbox"/>
	Partial	2 <input type="checkbox"/>
	Complete	3 <input type="checkbox"/>
5a. Motor Arm - Left (Elevate extremity to 90° and score drift/movement)	No drift	0 <input type="checkbox"/>
	Drift	1 <input type="checkbox"/>
	Can't resist gravity	2 <input type="checkbox"/>
	No effort against gravity	3 <input type="checkbox"/>
	No movement	4 <input type="checkbox"/>
	Amputation; joint fusion	na <input type="checkbox"/>
5b. Motor Arm - Right (Elevate extremity to 90° and score drift/movement)	No drift	0 <input type="checkbox"/>
	Drift	1 <input type="checkbox"/>
	Can't resist gravity	2 <input type="checkbox"/>
	No effort against gravity	3 <input type="checkbox"/>
	No movement	4 <input type="checkbox"/>
	Amputation; joint fusion	na <input type="checkbox"/>
6a. Motor Leg - Left (Elevate extremity to 30° and score drift/movement)	No drift	0 <input type="checkbox"/>
	Drift	1 <input type="checkbox"/>
	Can't resist gravity	2 <input type="checkbox"/>
	No effort against gravity	3 <input type="checkbox"/>
	No movement	4 <input type="checkbox"/>
	Amputation; joint fusion	na <input type="checkbox"/>
6b. Motor Leg - Right (Elevate extremity to 30° and score drift/movement)	No drift	0 <input type="checkbox"/>
	Drift	1 <input type="checkbox"/>
	Can't resist gravity	2 <input type="checkbox"/>
	No effort against gravity	3 <input type="checkbox"/>
	No movement	4 <input type="checkbox"/>
	Amputation; joint fusion	na <input type="checkbox"/>
7. Limb Ataxia (Finger - nose; heel - shin)	Absent	0 <input type="checkbox"/>
	Present in one limb	1 <input type="checkbox"/>
	Present in two limbs	2 <input type="checkbox"/>
	Amputation; joint fusion	na <input type="checkbox"/>
8. Sensory (Pin prick to face, arm, trunk, and leg compare side to side)	Normal	0 <input type="checkbox"/>
	Partial loss	1 <input type="checkbox"/>
	Severe loss	2 <input type="checkbox"/>
9. Best Language (Names items; describe picture, reads sentences)	No aphasia	0 <input type="checkbox"/>
	Mild-to-moderate aphasia	1 <input type="checkbox"/>
	Severe aphasia	2 <input type="checkbox"/>
	Mute	3 <input type="checkbox"/>
10. Dysarthria (Evaluate speech clarity by patient repeating listed words)	Normal articulation	0 <input type="checkbox"/>
	Mild-to-mod dysarthria	1 <input type="checkbox"/>
	Near to unintelligible	2 <input type="checkbox"/>
	Intubated or other barrier	na <input type="checkbox"/>
11. Extinction and Inattention (Use information from prior testing to identify neglect or double stimuli testing)	No neglect	0 <input type="checkbox"/>
	Partial neglect	1 <input type="checkbox"/>
	Complete neglect	2 <input type="checkbox"/>

EMERGENCY EVALUATION AND DIAGNOSIS OF ACUTE ISCHEMIC STROKE

- Determine contraindications to t-PA
- Treat uncontrolled severe hypertension
- Rule out Stroke Mimics
- Reevaluate for improvement or deterioration
- Informed Consent


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**INTRAVENOUS TPA ADMINISTRATION INCLUSION/
EXCLUSION CRITERIA FOR ISCHEMIC STROKE**

This inclusion/exclusion criteria provides a tool to be used in the assessment of a patient in the acute setting. Final decision to use TPA is at the discretion of the treating physician.

Patient Inclusion Criteria

- Yes 1. Age 18 years or older.
Yes 2. Clinical Diagnosis of Ischemic Stroke.
Yes 3. Measurable neurological deficit.
Yes 4. Clearly defined time of stroke onset (within 180 minutes of stroke onset).
Yes 5. Baseline CT scan showing no evidence of intracranial hemorrhage or mass.
Yes 6. Neurology consultation.
Yes 7. Informed consent (if possible).

Patient Exclusion Criteria

- No 1. Rapidly improving or minor symptoms.
No 2. CT scan showing evidence of intracranial hemorrhage.
No 3. Stroke or serious head trauma during preceding 3 months.
No 4. Prior history of intracranial hemorrhage that could increase the risk of intracranial hemorrhage.
No 5. Major surgery or other serious trauma during preceding 2 weeks.
No 6. GI or urinary tract hemorrhage during preceding 3 weeks. (Stool Guaiac +)
No 7. SBP >185 mm of Hg or DBP > 110 mm of Hg at the time of TPA infusion.
No 8. Myocardial infarction within 3 months.
No 9. Aggressive treatment to lower BP.
No 10. Symptoms of subarachnoid hemorrhage.
No 11. Arterial puncture at noncompressible site or LP during preceding 1 week.
No 12. Platelet count < 100,000/mm³. (TPA can be started before CBC results received, but should be discontinued if platelet count is <100,000/mm³)
No 13. Heparin during the preceding 48 hours associated with elevated PTT.
No 14. Clinical presentation suggesting pericarditis or myocardial infarction.
No 15. Pregnant female or lactating.
No 16. Currently taking oral anticoagulants with INR > 1.5.
No 17. Aortic Dissection

Relative Contraindications

1. Early signs of large cerebral infarction: edema, hypodensity, mass effect and obliteration of sulci in more than 1/3 of middle cerebral artery territory on CT Scan.
2. NIHSS >22.
3. Difficult to control hypertension.
4. History of seizure at stroke onset.
5. History of AVM or aneurysm.
6. Glucose < 50 or > 400
7. Carotid/Vertebral artery dissection

Decision to treat with TPA Yes No

Reason: _____

Signature: _____ Date/Time: _____

• Blood Pressure Management in Patients with Stroke*

	Blood Pressure	Treatment
Candidates for fibrinolysis	Pretreatment SBP >185 or DBP >110 mm Hg	Labetalol 10 - 20 mg IVP 1 - 2 doses or Enalapril 1.25 mg IVP
	Posttreatment DBP >140 mm Hg SBP >230 mm Hg or DBP 121 - 140 mm Hg SBP 180 - 230 mm Hg or DBP 105 - 120 mm Hg	Sodium nitroprusside (0.5 mcg/kg/min) Labetalol 10 - 20 mg IVP and consider labetalol infusion at 1 - 2 mg/min or nicardipine 5 mg/h IV infusion and titrate Labetalol 10 mg IVP, may repeat and double every 10 min up to maximum dose of 150 mg
Noncandidates for fibrinolysis	DBP >140 mm Hg	Sodium nitroprusside 0.5 mcg/kg/min, may reduce approximately 10 - 20%
	SBP >220 mm Hg or DBP 121 - 140 mm Hg or MAP > 130 mm Hg SBP <220 mm Hg or DBP 105 - 120 mm Hg or MAP < 120 mm Hg	Labetalol 10 - 20 mg IVP over 1 - 2 min; may repeat and double every 10 min up to maximum dose of 150 mg or nicardipine 5 mg/h IV infusion and titrate Antihypertensive therapy indicated only if AMI, aortic dissection, severe CHF, or hypertensive encephalopathy present

*Adapted from 2005 Advanced Cardiac Life Support (ACLS) Guidelines and NIH Stroke Scale

STROKE MIMICS

(Initial Impression)

- Seizure and postictal state
- Systemic infection
- Brain tumor
- Toxic-metabolic
- Positional vertigo
- Cardiac
- Syncope
- Trauma
- Subdural hematoma
- Herpes encephalitis
- Transient global amnesia
- Dementia
- Multiple Sclerosis Demyelinating disease
- Cervical spine fracture
- Myasthenia Gravis
- Parkinsonism
- Hypertensive encephalopathy
- Conversion disorder

STROKE MIMICS

(After Initial Work Up)

- Paresthesia or numbness of unknown cause
- Seizure
- Complicated Migraine
- Peripheral Neuropathy
- Cranial Nerve Neuropathy
- Psychogenic Paralysis

Guidelines for the Early Management of Adults With Ischemic Stroke

A Guideline From the American Heart Association/
American Stroke Association Stroke Council, Clinical Cardiology
Council, Cardiovascular Radiology and Intervention Council, and the
Atherosclerotic Peripheral Vascular Disease and Quality of Care
Outcomes in Research Interdisciplinary Working Groups

*The American Academy of Neurology affirms the value of this guideline
as an educational tool for neurologists.*

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Purpose—Our goal is to provide an overview of the current evidence about components of the evaluation and treatment of adults with acute ischemic stroke. The intended audience is physicians and other emergency healthcare providers who treat patients within the first 48 hours after stroke. In addition, information for healthcare policy makers is included.

Methods—Members of the panel were appointed by the American Heart Association Stroke Council's Scientific Statement Oversight Committee and represented different areas of expertise. The panel reviewed the relevant literature with an emphasis on reports published since 2003 and used the American Heart Association Stroke Council's Levels of Evidence grading algorithm to rate the evidence and to make recommendations. After approval of the statement by the panel, it underwent peer review and approval by the American Heart Association Science Advisory and Coordinating Committee. It is intended that this guideline be fully updated in 3 years.

Results—Management of patients with acute ischemic stroke remains multifaceted and includes several aspects of care that have not been tested in clinical trials. This statement includes recommendations for management from the first contact by emergency medical services personnel through initial admission to the hospital. Intravenous administration of recombinant tissue plasminogen activator remains the most beneficial proven intervention for emergency treatment of stroke. Several interventions, including intra-arterial administration of thrombolytic agents and mechanical interventions, show promise. Because many of the recommendations are based on limited data, additional research on treatment of acute ischemic stroke is needed. (*Stroke*. 2007;38:1655-1711.)

Key Words: AHA Scientific Statements ■ emergency medical services ■ stroke ■ acute cerebral infarction
■ tissue plasminogen activator

EMERGENCY EVALUATION AND DIAGNOSIS OF ACUTE ISCHEMIC STROKE

Class I Recommendations:

1. Organized protocol for the emergency evaluation of pts with suspected stroke. Goal is to complete evaluation and decide treatment within 60 minutes of pt arrival in ED (Head CT within 25 minutes of ED arrival, study interpretation within 20 minutes). Careful clinical assessment, including neuro exam.
2. Use of stroke rating scale, preferably NIHSS.

EMERGENCY EVALUATION AND DIAGNOSIS OF ACUTE ISCHEMIC STROKE

Class I Recommendations:

3. Limited number of hematologic, coagulation, and biochemistry tests are recommended during initial emergency evaluation.
- Time is critical: thrombolytic treatment should **not** be delayed while waiting for results of PT/PTT or platelet count, unless bleeding abnormality/thrombocytopenia suspected, pt taking coumadin and heparin, or anticoagulation use suspected.

Time is brain . . . every minute counts.

EMERGENCY EVALUATION AND DIAGNOSIS OF ACUTE ISCHEMIC STROKE

Class I Recommendations

4. Patients with clinical or other evidence of acute cardiac or pulmonary disease may warrant chest x-ray.
5. ECG recommended because of high incidence of heart disease in patients with stroke.

EMERGENCY EVALUATION AND DIAGNOSIS OF ACUTE ISCHEMIC STROKE

Class III Recommendations:

1. Most patients with stroke do not need a chest x-ray as part of their initial evaluation (**new recommendation**).
2. Most patients with stroke do not need an examination of CSF (indicated if symptoms suggestive of SAH, and CT scan negative for blood).

EARLY DIAGNOSIS: BRAIN AND VASCULAR IMAGING

Class I recommendations:

1. Imaging of brain recommended before initiating any specific treatment for acute ischemic stroke.
2. In most instances, CT will provide the information to make decisions about emergency management

EARLY DIAGNOSIS: BRAIN AND VASCULAR IMAGING

Not TPA candidate...



EARLY DIAGNOSIS: BRAIN AND VASCULAR IMAGING

Class I recommendations:

3. Brain imaging should be interpreted by MD with expertise in reading CT or MRI brain (**new recommendation**).
4. Some findings on CT, including presence of dense artery sign, associated with poor outcomes after stroke.
5. Multimodal CT and MRI may provide additional info that will improve diagnosis of ischemic stroke (**new recommendation**).

EARLY DIAGNOSIS: BRAIN AND VASCULAR IMAGING

Dense MCA artery sign



EARLY DIAGNOSIS: BRAIN AND VASCULAR IMAGING

Class II recommendations:

1. Data insufficient to state (except for hemorrhage) that any specific CT finding should preclude treatment with t-PA.
2. Vascular imaging is necessary preliminary step of IA administration of pharmacological agents, surgical procedures, or endovascular interventions.

EARLY DIAGNOSIS: BRAIN AND VASCULAR IMAGING

Class III recommendations:

1. Emergency treatment of stroke should not be delayed in order to obtain multimodal imaging studies (**new recommendation**).
2. Vascular imaging should not delay treatment of pts whose sxS started <3 hours, and who have acute ischemic stroke. (**new recommendation**).

Time is brain . . . every minute counts.

THROMBOLYTICS: IV t-PA

Class I recommendations:

1. IV t-PA is recommended for selected patients who may be treated within 3 hours of onset of symptoms of ischemic stroke.
2. Besides bleeding complications, physicians should be aware of potential side effect of angioedema that may cause partial airway obstruction (**new recommendation**).

THROMBOLYTICS: IV t-PA

Class II recommendations:

1. A patient whose BP can be lowered safely with anti-HTN agents may be eligible for treatment; MD should assess stability of BP before starting t-PA.
2. Patients with a seizure at time of stroke onset may be eligible for treatment, as long as MD convinced residual impairments are secondary to stroke and **not** post-ictal phenomenon (**Differs from prior guideline, and represents broadening of eligibility**).

THROMBOLYTICS: IV t-PA

Original NINDS trial:

- Absolute difference in favorable outcome of t-PA versus placebo was 11-13% across the scales.
- Depending upon the scale, the increase in relative frequency of favorable outcome in patients receiving t-PA ranged from 33% to 55%.
- The effect of t-PA was independent of stroke subtype, with beneficial effects seen in those with small vessel occlusive, large vessel occlusive and cardio-embolic induced ischemia.

THROMBOLYTICS: IV t-PA

Original NINDS trial:

- Approximately 6% of the t-PA treated patients sustained a symptomatic ICH within 36 hours following treatment compared with 0.6% of patients receiving placebo.
- Half of the t-PA associated symptomatic hemorrhages were fatal, however t-PA treatment was **not associated with an increase in mortality** in the three-month outcome analysis.

THROMBOLYTICS: IV t-PA

Intravenous t-PA has proven efficacy in the clinical trial setting. The beneficial effects of t-PA have been replicated in clinical practice, and outcome following treatment with intravenous t-PA appears to be consistent with data reported by the NINDS investigators.

THROMBOLYTICS: IV t-PA

The benefits of t-PA also appear to be durable. A follow-up study conducted by the NINDS investigators showed that patients treated with t-PA were 30% more likely than placebo treated patients to have minimal or no disability at 6 months and 1 year, compatible with the findings reported at three months.

THROMBOLYTICS: INTRAARTERIAL t-PA

Class I recommendations:

1. IA thrombolysis is an option for treatment of selected patients who have major stroke of <6 hours' duration due to occlusion of MCA, and who are not otherwise candidates for IV t-PA.
2. Treatment requires the patient to be at an experienced stroke center with immediate access to cerebral angiography and qualified interventionalists (**new recommendation**).

THROMBOLYTICS: INTRAARTERIAL t-PA

Class II recommendation:

1. IA thrombolysis is reasonable in patients who have contraindication to use of IV-TPA, such as recent surgery (**new recommendation**).

THROMBOLYTICS: INTRAARTERIAL t-PA

Angiogram showing the microcatheter inserted into a blocked artery prior to administration of the t-PA



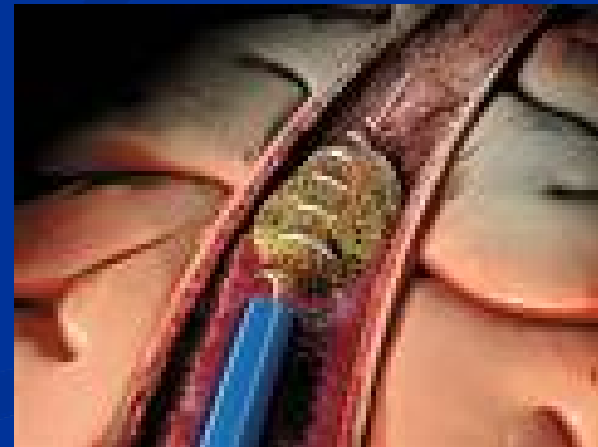
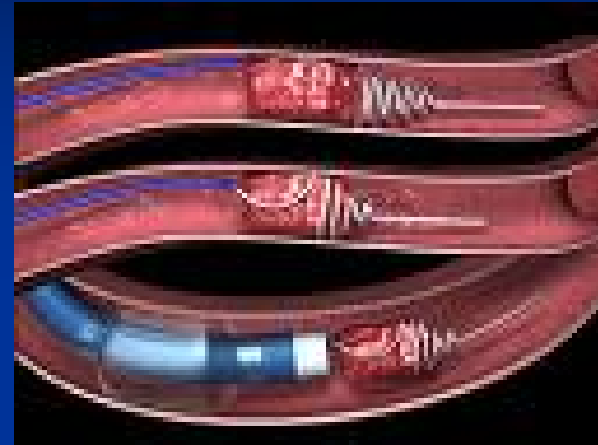
ENDOVASCULAR INTERVENTION

Class II recommendations:

MERCI device is reasonable intervention for extraction of intra-arterial thrombi in carefully selected patients, but panel recognizes that utility of device in improving outcomes after stroke is unclear (**new recommendation**).

ENDOVASCULAR INTERVENTION

- The MERCI retriever (Mechanical Embolus Removal in Cerebral Ischemia), a cork-screw shaped device, is the first FDA approved mechanical device for the treatment of ischemic.



ENDOVASCULAR INTERVENTION



ANTICOAGULANTS

Class III Recommendations:

1. Urgent anticoagulation with goal of preventing early recurrent stroke, halting neurological worsening, or improving outcomes after acute ischemic stroke **not recommended**.
2. Urgent anticoagulation **not recommended** for patients with moderate to severe strokes because of increased risk of serious ICH complications.
3. Initiation of anticoagulant treatment within 24 hours of IV t-PA is **not recommended**.

ANTIPLATELET AGENTS

Class I recommendation:

1. Oral administration of ASA 325 mg within 24 to 48 hours after stroke onset is recommended for treatment of most ischemic strokes.

Time is brain . . . every minute counts.

ANTIPLATELET AGENTS

Class III recommendations:

1. ASA not substitute for other acute treatments, including IV t-PA.
2. ASA as adjunctive treatment within 24 hours of thrombolytic treatment is not recommended.

EARLY SUPPORTIVE TREATMENT

- Avoid hypoxemia
- Aspiration precautions
- Avoid Hyperthermia
- Avoid Hyperglycemia
- Avoid Dehydration/ Hypotension
- Permissive Hypertension

ADMISSION TO HOSPITAL AND GENERAL ACUTE TREATMENT

Class I recommendations:

1. Use of comprehensive specialized stroke care (stroke units) incorporating rehab is recommended.
2. Use of standardized stroke care order sets is recommended to improve general management (**new recommendation**).
3. Early mobilization of less severely affected patients and measure to prevent subacute complications of stroke are recommended.

ADMISSION TO HOSPITAL AND GENERAL ACUTE TREATMENT

Class I recommendations:

4. Assessment of swallowing before starting eating or drinking is recommended (**new recommendation**).
5. Patients with suspected pneumonia or UTI should be treated with antibiotics.
6. Subcutaneous administration of anticoagulants is recommended for treatment of immobilized patients to prevent DVT.
7. Early institution of interventions to prevent recurrent stroke is recommended.

HYPERTENSION TREATMENT AFTER STROKE

Current Guideline recommendation (Class I):

Management of arterial hypertension remains controversial. Many patients have spontaneous declines in BP during first 24 hours post-stroke. Cautious approach to treatment of HTN recommended.

HYPERTENSION TREATMENT AFTER STROKE

Concerns:

- Aggressive treatment of BP may lead to neurological worsening by reducing perfusion pressure to ischemic areas of brain.
- In majority of patients, decline in BP occurs within first hours after stroke, **even without specific treatment.**

HYPERTENSION TREATMENT AFTER STROKE

Panel consensus:

Emergency administration of antihypertensive agents should be withheld unless systolic BP > 220 mm Hg, or diastolic BP > 120 mm Hg.

HYPERTENSION TREATMENT AFTER STROKE

New data from Control of Hypertension and Hypotension Immediately Post Stroke study (CHIPPS) presented at Feb. 2008 International Stroke conference...

HYPERTENSION TREATMENT AFTER STROKE

CHIPPS:

- 179 randomized pts, hemorrhagic or ischemic stroke within previous 36 hours, and SBP >160 mm Hg.
- Nondysphagic pts received lisinopril, labetalol, or placebo. Dysphagic pts received similar doses of sublingual lisinopril, IV labetalol, or placebo.
- Target SBP was 145 to 155 mm Hg, or drop in SBP of at least 15 mm Hg.
- Primary outcome: death or dependence at 2 weeks. Secondary outcome: 3 month mortality.

HYPERTENSION TREATMENT AFTER STROKE

Results:

- Active treatment group had greater drop in BP within first 24 hours, and at 2 weeks.
- Active treatment did not cause early increase in stroke severity.
- 2 weeks post-stroke, death and dependence rates were similar between 2 groups.
- At 3 months, active treatment group had much lower mortality (placebo group more than twice as likely to die compared to active treatment group).

HYPERTENSION TREATMENT AFTER STROKE

American Stroke Assoc. spokesperson:

If results can be replicated in a larger phase 3 study, findings could have major impact on stroke guidelines.

TREATMENT OF ACUTE NEUROLOGICAL COMPLICATIONS

Class I recommendations:

1. Patients with major infarctions affecting cerebral hemisphere or cerebellum are at high risk for complicating (malignant) brain edema and increased ICP. Measures to lessen risk of edema and close monitoring of the patient for signs of neurological worsening during the first days after stroke recommended.
2. Patients with acute hydrocephalus can be treated with a ventricular drain.
3. Decompressing surgical evacuation of space occupying cerebellar infarction is potentially life-saving, and clinical recovery can be very good.
4. Recurrent seizure should be treated.

TREATMENT OF ACUTE NEUROLOGICAL COMPLICATIONS

Class II recommendations:

1. Aggressive medical measure such as osmotherapy for malignant brain edema after large cerebral infarction are unproven. Hyperventilation is short-lived intervention.
2. Decompressive surgery for malignant edema of cerebral hemisphere may be life-saving, but impact on morbidity unknown.
3. No specific recommendations for tx of pts with asymptomatic hemorrhagic transformation.

TREATMENT OF ACUTE NEUROLOGICAL COMPLICATIONS

Hemicraniectomy



TREATMENT OF ACUTE NEUROLOGICAL COMPLICATIONS

Class III recommendations:

1. Corticosteroids not recommended for treatment of cerebral edema and increased ICP.
2. Prophylactic anticonvulsants not recommended.

STROKE PREVENTION IN PATIENTS WITH STROKE: ANTIPLATELETS

(FROM 2008 AHA/ASA UPDATE)

Class I recommendations:

1. Patients with non-cardioembolic ischemic stroke, antiplatelet agents rather than oral anticoagulation are recommended to reduce the risk of recurrent stroke and other CV events.
2. Aspirin (50 to 325mg) monotherapy, the combination of aspirin and extended-release dipyridamole (Aggrenox), and clopidogrel monotherapy (Plavix) are all acceptable initial options . **(Formerly Class II recommendation)**.
3. The combination of aspirin and extended-release dipyridamole is recommended over aspirin alone. **(Formerly Class II recommendation)**.

STROKE PREVENTION IN PATIENTS WITH STROKE: ANTIPLATELETS

(FROM 2008 AHA/ASA UPDATE)

Class II recommendations:

1. Clopidogrel may be considered over aspirin alone on the basis of direct comparison trials.
2. For patients allergic to aspirin, clopidogrel is reasonable.

Class III recommendations:

Addition of aspirin to clopidogrel increases risk of hemorrhage. Combo of ASA and clopidogrel not routinely recommended for ischemic stroke patients, unless specific indications (ie, coronary stent or acute coronary syndrome). Evidence from CHARISMA and MATCH trials.

SUMMARY

- Stroke is an emergency.
- Call 911.
- IV t-PA is effective and should be given to patients who qualify adhering strictly to guidelines.
- Stroke patients >3hrs <6hrs, may benefit from IA t-PA or thrombectomy.
- Pay attention to acute supportive treatment.
- Antiplatelet within 24 hours.
- Permissive hypertension, but we may become more aggressive in future.
- No role for anticoagulation for stroke itself.
- Watch out for acute neurological complications.

Time is brain . . . every minute counts.