STROKE REFERENCE CARDS

LOUISIANA
EMERGENCY
RESPONSE
NETWORK

Right Place. Right Time. Right Care.

v.20140811

LERN Stroke System of Care

LERN's ongoing development of Louisiana's statewide stroke care system is guided by the evidence-based "hub and spoke" model that facilitates widespread patient access to lifesaving care and treatment with tissue plasminogen activator (tPA), the only FDA approved intervention for treatment of an occlusive stroke within the first few hours.

Louisiana's "hub and spoke" model includes Comprehensive Stroke Center and Primary Stroke Center hubs, and spoke hospitals connected by telemedicine.

More information about the LERN Stroke System of Care can be found online at www.lern.la.gov

LERN Communication Center – 1 -866-320-8293

The LERN Communications Center (LCC) is a key component of our statewide systems of care for trauma, stroke and STEMI. The LCC serves as a resource for directing stroke patients to appropriate hospitals.

LOUISIANA EMERGENCY RESPONSE NETWORK

NIH STROKE SCALE (NIHSS)

1a. Level of Consciousness (LOC)

0 = Alert, keenly responsive
1 = Not alert; but arousable by minor stimulation
2 = Not alert; requires repeated stimulation, or is obtunded and needs strong/painful stimuli to make movements
3 = Responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, and areflexic

Examiner must choose a response if full evaluation is prevented by such obstacles as ET tube, language barrier, oral trauma/bandages etc. A3 is only scored only if the patient makes no movement (other than reflexive posturing) in response to noxious stimuli.

1b. LOC Questions – "What month is it?" and "How old are you?"

0 = Answers both questions correctly
1 = Answers one question correctly
2 = Answers neither question correctly

Score only initial answer (no credit for being close). Patients unable to speak due to intubation, oral trauma, severe dysarthria, language barrier, etc. are scored 1. Aphasic and stuporous patients, score 2.

1c. LOC Commands – "Open and close your eyes", and "Grip and release your hand"

0 = Performs both tasks correctly
1 = Performs one task correctly
2 = Performs neither task correctly

Substitute another one-step command if hands cannot be used. Credit given if attempt made but unable to complete due to weakness. If patient does not respond to command, task should be demonstrated and result scored. Only first attempt scored.

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NIHSS (continued)

2. Best Gaze (only horizontal movement tested)

Establish contact and ask patient "follow my finger"

0 = Normal
1 = Partial gaze palsy
2 = Forced deviation or total gaze paresis

Appropriate for aphasic patients. Forced deviation or total gaze paresis is not overcome by oculocephalic maneuver. Score voluntary or reflexive, horizontal movements (not caloric test). Test patients with ocular trauma, bandages, blindness, etc., for reflexive movement. Patients with conjugate deviation of the eyes (overcome by voluntary or reflexive activity) and those with peripheral nerve paresis (oculomotor valve CN III, IV, VI) are scored 1.

3. Visual Fields – Use confrontation, finger counting, or visual threat. Confront upper/lower quadrants of visual field

0 = No visual loss
1 = Partial hemianopia
2 = Complete hemianopia
3 = Bilateral hemianopia

Test patients with unilateral blindness or enucleation in remaining eye. Patients with clear-cut asymmetry, including quadrantanopia, are scored 1. Blind patients are scored 3. Test again using double simultaneous stimulation. Score 1 for extinction and record under item #13.

NIHSS (continued)

4. Facial Palsy

By words or pantomime, encourage the patient to "Show me your teeth." "Raise your eyebrows." "Close your eyes."

0 = Normal symmetrical movements
1 = Minor paralysis (flattened nasolabial fold, asymmetry on smile)
2 = Partial paralysis (lower face)
3 = Complete paralysis

Remove bandages, tape, tubes before testing if possible. In poorly responsive patients, some symmetry of grimace to noxious stimuli.

5 & 6. Motor Arm (Right and Left)

Alternately position patient's arm. Extend each arm with palms down (90 degrees if sitting, 45 if supine).

0 = No drift
1 = Drift
2 = Some effort vs. gravity
3 = No effort against gravity
4 = No movement
UN = Amputation or joint fusion

Test each arm in turn (nonparetic first). Drift is scored if arm falls before 10 seconds.

7 & 8. Motor Leg (Right and Left)

Alternately position patient's leg. Extend each leg (30 degrees while supine).

0 = No drift
1 = Drift
2 = Some effort vs. gravity
3 = No effort against gravity
4 = No movement
UN = Amputation or joint fusion

Test each leg in turn (nonparetic first). Drift is scored if leg falls before 5 seconds.

NIHSS (continued)

9. Limb Ataxia

Ask patient (eyes open) to "Touch your finger to your nose." "Touch your heel to your shin."

0 = Absent
1 = Present in one limb
2 = Present in two limbs
UN = Amputation or joint fusion

Preform finger-nose and heel-shin test on both sides to determine unilateral cerebellar lesion. Score 0 if paralyzed or cannot understand. Score 1 or 2 only if ataxia disproportionate to weakness. Only UN if amputated or contracted.

10. Sensory

Test as many body parts as possible (arms [not hands], legs, trunk, face) for sensation using pinprick or noxious stimulus
(if obtunded or aphasic).

0 = Normal
1 = Mid to moderate sensory loss
2 = Severe to total sensory loss

Score sensory loss due to stroke only. Stuporous or aphasic, score 0 or 1.

11. Best Language

Using included pictures and sentence list, ask the patient to "Describe what you see in this picture." "Name the items in the picture." " Read these sentences."

0 = No aphasia
1 = Mild to Moderate aphasia
2 = Severe aphasia
3 = Mute, global aphasia

Patients with visual loss can be asked to identify and describe objects placed in the hand. Intubated patients should be asked to write their answers. The examiner must choose a score for stuporous or uncooperative patients. Only comatose patients & mute patients unable to follow one step commands are scored 3.

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NIHSS (continued)

12. Dysarthria

Use simple word list and ask "Read or Repeat these words." (Mama, Tip-Top, Fifty-Fifty, Thanks, Huckleberry, Baseball Player)

0 = Normal articulation
1 = Mild to moderate dysarthria
2 = Severe dysarthria (<50% intelligible)
X = Intubated/physical barrier

Patients with severe aphasia can be scored based on the clarity of articulation of their spontaneous speech. Score X only if intubated or have other physical barrier to speech. Do not tell patients why they are being tested.

13. Extinction and Inattention

Sufficient info to determine these scores may have been obtained during prior testing
0 = No abnormality
1 = Visual, tactile, auditory, spatial, or personal inattention
2 = Profound hemi-attention or extinction to more than one modality

Lack of patient response and inattention may already be evident from the previous items. Score 0 if the patient has a severe visual loss preventing visual double simultaneous stimulation, but the response to cutaneous stimuli is normal, or if the patient has aphasia but does appear to attend to both sides. The presence of visual spatial neglect or anosagnosia may also be evidence of abnormality.

Stroke severity scaling:

< 7 = mild	15-20 = moderately severe
7-14 = moderate	> 20 = severe

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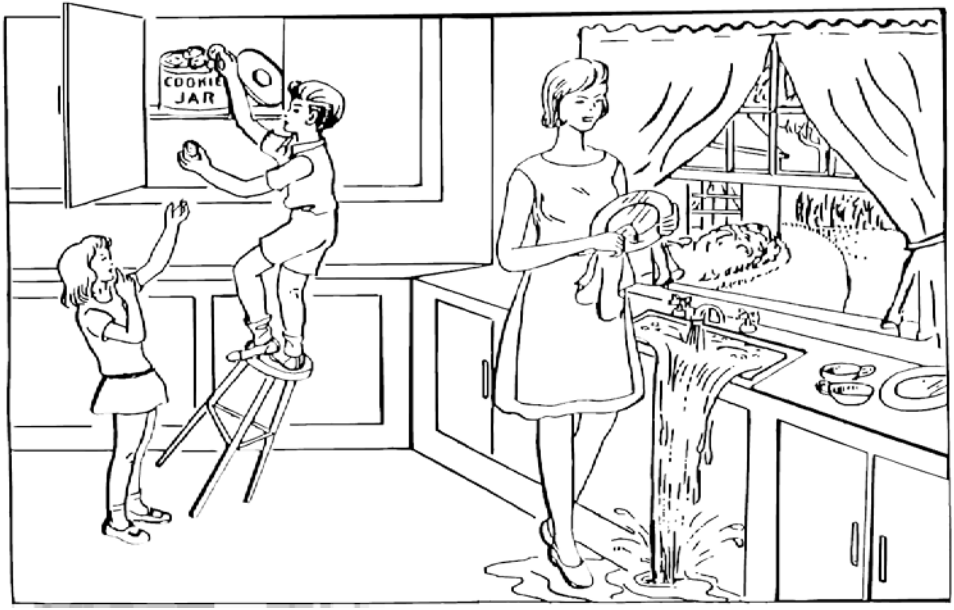
NIHSS testing card-picture description



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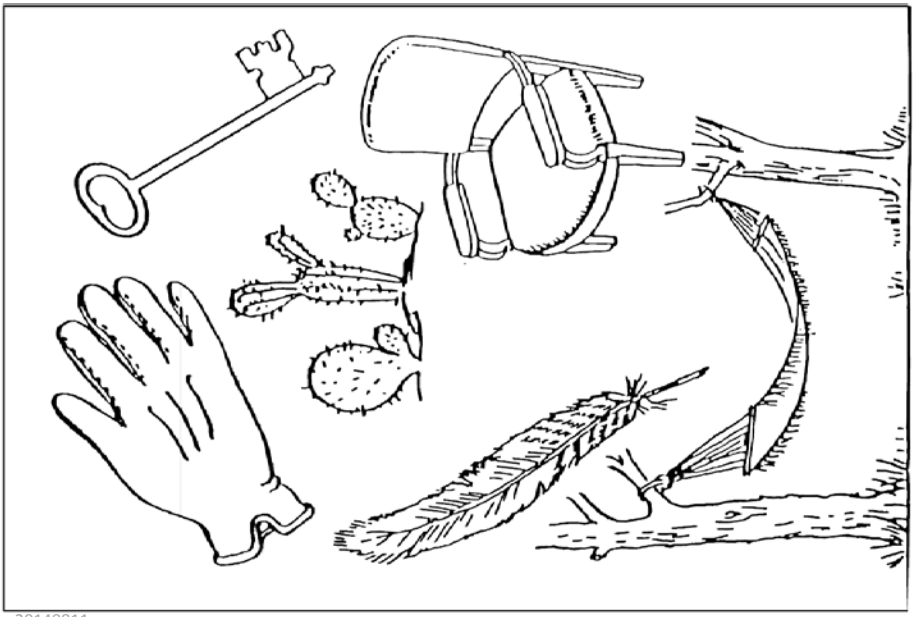
NIHSS testing card-naming list



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NIHSS testing card-sentences

- You know how
- Down to earth
- I got home from work
- Near the table in the dining room
- They heard him speak on the radio last night

NIHSS testing card-word list

- MAMA
- TIP-TOP
- FIFTY-FIFTY
- THANKS
- HUCKLEBERRY
- BASEBALL PLAYER

AHA/ASA Exclusions for alteplase (tPA)

Exclusions:

- CT Head demonstrates hemorrhage or intracerebral mass lesion (meningioma is not an exclusion)
- History of previous intracerebral hemorrhage (no longer FDA contraindication, recent ICH falls under Warnings & Precautions)
- Intracranial surgery, serious head trauma or prior stroke in previous 3 months
- Symptoms suggests of SAH
- Evidence of active bleeding or acute trauma (fracture) on exam
- BP Systolic > 185 or Diastolic > 110 at time of treatment
- Platelet count < 100,000
- If receiving Heparin in last 48 hours, PTT outside of normal range
- If on warfarin (Coumadin), INR > 1.7
- Current use of new oral anticoagulants (use in last 48 hours)

(dabigatran/Pradaxa, rivaroxaban/Xarelto, apixaban/Eliquis, edoxaban/Lixiana)

Jauch EC, et al. Guidelines for the early management of patients with acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association (AHA/ASA). Stroke 2013;44(3):870-947. PMID 23370205

AHA/ASA Warnings for alteplase (tPA)

Warnings:

- Blood glucose < 50mg/dl at time of treatment
  - Elevated blood glucose is a risk factor for hemorrhagic conversion and should be treated, but treatment should not delay initiation of alteplase (tPA)
- Myocardial infarction in past 3 months
- Major surgery or serious trauma in past 14 days
  - Risk of bleeding should be considered and/or discussed with surgeon
- Arterial puncture @ noncompressible site in the past 7 days
- GI or GU hemorrhage in the past 21 days
- Multilobar infarction (hypodensity > 1/3 cerebral hemisphere on CT)

Jauch EC, et al. Guidelines for the early management of patients with acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. Stroke 2013;44(3):870-947. PMID 23370205

Care with alteplase (tPA)

- BP must be < 185/110 for treatment with IV alteplase (tPA).
- Nicardipine infusion is the preferred medication to achieve and maintain BP <180/105 before and for the 24 hours following treatment with tPA. An alternative is labetalol 10-20mg IV over 1-2 min, provided the HR >60

  AND
- Neuro Checks & Mini NIHSS monitored
  - q 15 minutes for 2 hours
  - q 30 minutes for 6 hours
  - then hourly for 16 hours
- Monitor for signs of angioedema (especially if on ACE-Inhibitor)
  - Recommended treatment for angioedema includes – consider intubation before transfer, Benadryl 50mg IV, Zantac 50mg IV, Solumedrol 50-100mg IV, consider racemic epinephrine
- HOB flat x 24 hours following alteplase (tPA) (if tolerated and secretion management not problematic)
- CT head without contrast to be ordered at 24 hours. Once no hemorrhage confirmed, antithrombotic therapy/pharmacological DVT prophylaxis can be started.

All treatment decisions should be made in collaboration with your facility's neurological expert.

Jauch EC, et al. Guidelines for the early management of patients with acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. Stroke 2013;44(3):870-947. PMID 23370205.

Hill MD, Lye T, Moss H, Barber PA, Demchuk AM, Newcommon NJ, GreenTL, Kenney C, Cole-Haskayne A, Buchan AM. Hemi-orolingual angioedema and ACE inhibition after alteplase treatment of stroke. Neurology.2003;60:1525–1527.

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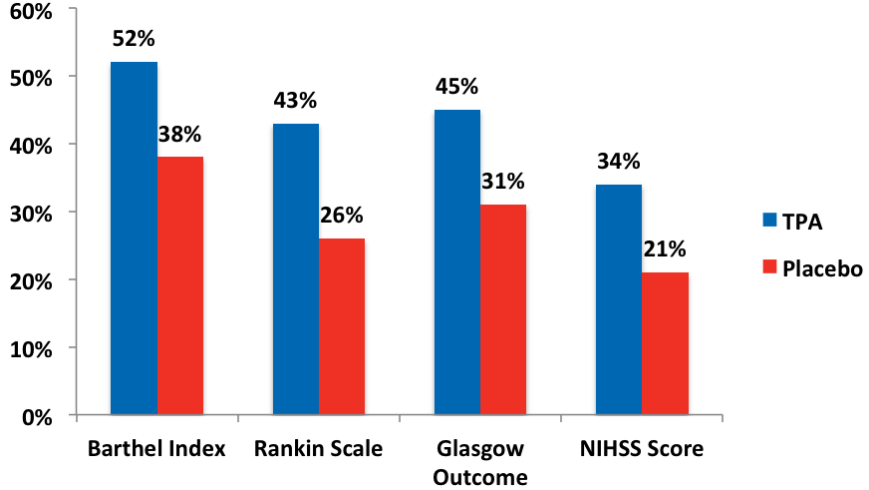
NINDS TPA Stroke Trial



Global outcome statistic: OR = 1.7, 50% v. 38% = 12% benefit

N Engl J Med 1995;333;1581-7

*From American Heart Association, Target: Stroke

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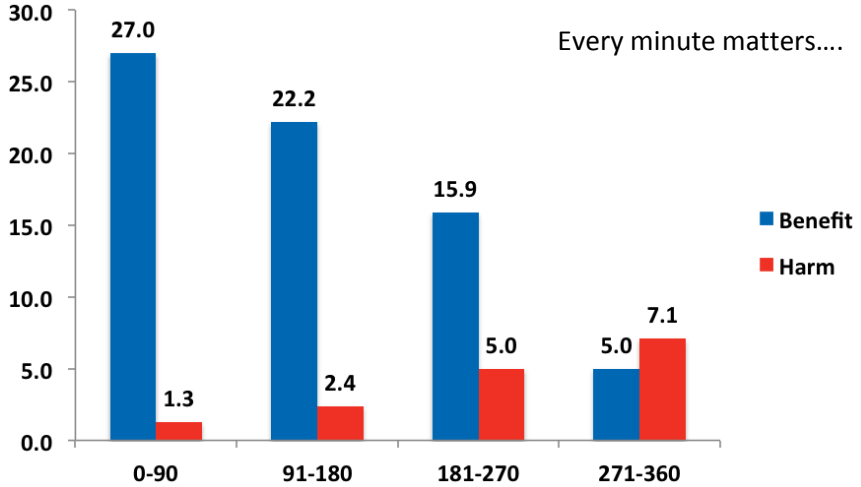
Number of Patients Who Benefit and Are Harmed per 100 Patients tPA Treated in Each Time Window



Every minute matters….

Lansberg et al, Stroke 2009

*From American Heart Association, Target: Stroke

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Number Needed to Treat to Benefit from IV tPA Across Full Range of Functional Outcomes

Outcome	NNT
Normal/Near Normal	8.3
Improved	3.1

For every 100 patients treated with tPA,
32 benefit, 3 harmed

Better outcome by 1 or more grades on the mRS

Saver JL et al Stroke 2007; 38:2279-2283

*From American Heart Association, Target: Stroke

Complications with alteplase (tPA)

Reasons to suspect alteplase (tPA) related Hemorrhage

- Neurological decline (suggest using mini NIHSS increase of ≥ 2 points)
- Sudden changes in blood pressure or heart rate
- Decline in level of consciousness
- Seizure
- Nausea/vomiting
- Severe or worsening headache

All treatment decisions should be made in collaboration with your facility's neurological expert.

Plan for Treatment – every minute matters

1. Stop alteplase (tPA) if still infusing
2. Type & Cross
3. Send fibrinogen level (goal > 100mg/dl) and coagulation profile
4. STAT CT of head without contrast

- If no ICH, resume alteplase (tPA).
- If ICH, consider:
  - 8-10 units of cryoprecipitate
    - May use FFP if no cryoprecipitate available, but FFP does not have sufficient fibrinogen
  - 6 units of platelets
  - Neurosurgery consult

* There are no evidence-based guidelines for the management of tPA-related hemorrhage.

**Rasler F. Emergency treatment of hemorrhagic complications of thrombolysis. Ann Emerg Med. 2007;50(4):485.

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Suggested Goals for Stroke Care

- Temperature < 37.2°C
- Blood Glucose < 160mg/dl
- HOB
  - Ischemic flat for 24 hours, unless poor control of secretions
  - ICH 30 degrees elevation
- Blood Pressure
  1. During tPA and Post tPA < 180/105 x 24 hours
  2. For patients NOT treated with tPA - Permissive HTN up to SBP < 220, DBP < 110 (should be individualized)
  3. For patients with ICH presenting with systolic blood pressure (SBP) between 150 and 220 mm Hg and without contraindication to acute BP treatment, acute lowering of SBP to 140 mm Hg is safe (Class I; level of evidence A) and can be effective for improving functional outcome (Class IIa; level of evidence B; revised from the previous guideline).

All treatment decisions should be made in collaboration with your facility's neurological expert.

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Initial Assessment of ICH

- Airway/breathing-Low threshold for intubation
- Measure GCS; brainstem reflexes
- Measure coagulation profile and platelets
- CT of head without contrast
  - Determine location and volume
  - Identify intraventricular blood or hydrocephalus

All treatment decisions should be made in collaboration with your facility's neurological expert.

- Guidelines recommend SBP < 140mmHg; achieved with labetalol boluses (10-20mg) for SBP 160-200 and nicardipine infusion for SBP > 200, if available
- If suspicion for ICP or herniation, consider:
  - SBP goal is < 180 with MAP goal > 100 (2007 AHA/ASA guidelines)
  - Head-of-bed elevated at 30°
  - Patient's neck in a neutral position to maximize venous outflow
  - Minimizing the patient's agitation and pain
  - Hyperventilation
  - Hyperosmolar therapies-mannitol and hypertonic saline
  - Alert neurosurgery for possible clot evacuation and/or ventriculostomy
- Prophylactic antiseizure medication is not recommended

AHA/ASA Guideline for the Management of Spontaneous Intracerebral Hemorrhage. Stroke. 2010;41:2108-2129.

Suggested Methods for Reversal of Coagulopathy in ICH

All treatment decisions should be made in collaboration with your facility's neurological expert.

Warfarin/Coumadin related intracranial hemorrhage

- STAT PT/INR; for INR >1.4:
- Vitamin K 10mg IV x 1
- Prothrombin Complex Concentrate (PCC, 4 factor or 3 factor) 50units/kg OR FFP, if PCC not available
- Repeat PT/INR 30min after PCC or 1hr after FFP

Dabigatran/Pradaxa related intracranial hemorrhage

- Administer 50g activated charcoal if dose taken within 2 hours
- Administer Idarucizumab/Praxbind 2.5mg/50ml infused by gravity x 2 doses for total of 5mg/100ml. Flush with NS.
- If Idarucizumab/Praxbind, give PCC (4 factor or 3 factor) 50units/kg OR FFP, if PCC not available

Factor Xa inhibitor related intracranial hemorrhage

(apixaban/Eliquis, edoxaban/Savaysa, rivaroxaban/Xarelto)

- Administer 50g activated charcoal if dose taken within 2 hours
- Prothrombin Complex Concentrate (4 factor or 3 factor 50units/kg) OR FFP, if PCC not available

Guideline for Reversal of Antithrombotics in Intracranial Hemorrhage. Neurocritical Care. doi:10.1007/s12028-015-0222-x

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