NIH Stroke Scale

LeighAnn Persondek MSN, APRN, ACNP-BC, ANVP-BC, CNRN

Objectives

- Discuss pre-hospital stroke scales, LVO stroke scales and the NIHSS
- Review the neurological assessment needed to use the NIHSS
- Practice the scoring of a stroke patient utilizing the NIHSS

Importance of Stroke Scales

- Standardized stroke severity scale to describe neurological deficits in acute stroke patients.
- Allows us to:
  - Quantify our clinical exam
  - Provide for standardization
  - Determine the if the patients' neurological status is improving or deteriorating
  - Communicate patient status

Lets discuss some commonly used pre-hospital stroke scales and their importance

Commonly Used Pre-hospital Stroke Scales

- Cincinnati Pre-Hospital Stroke Scale (CPSS)
- Los Angeles Prehospital Stroke Scale (LAPSS)
- Face, Arm, Speech, Time (FAST)
- Balance, Eye, Face, Arms, Speech, Time (BEFAST)

- Scales often used by EMS personnel prior to transfer to the hospital.

Cincinnati Pre-hospital Stroke Scale

- Facial Droop
- Arm Drift
- Speech

- Patients with 1 of these 3 findings as a new event have a 72% probability of an ischemic stroke.

- If all 3 findings are present the probability of an acute stroke is more than 85%.

Los Angeles Pre-hospital Stroke Scale

- Over the age of 45
- No history of seizures
- Neurological symptoms started to present within the last 24 hours
- Patient is not hospitalized
- Blood sugar is 60-400 mg/dL
- Unilateral (and not bilateral) exhibition of facial droop, grip weakness, arm weakness or other observable motor asymmetries

- If all of these criteria are met (or not ascertainable) the LAPSS is positive for stroke. Patients may still be experiencing a stroke even if LAPSS criteria are not met.

Face, Arm, Speech, Time (FAST)

- FACE-is it drooping
- ARMS-can you raise both
- SPEECH-is it slurred or jumbled
- TIME-to call 911 right away

- Used to teach the general public stroke symptoms and the urgency.
- There is a modified version becoming more common called BEFAST to help identify posterior stroke symptoms
  - In addition to the FAST acronym it includes:
    - B: Balance
    - E: eyes

Large Vessel Occlusion Scales (LVO screening tools)

- Los Angeles Motor Scale (LAMS)

- Rapid Arterial oCclusion Evaluation (RACE)

- Vision, Aphasia, Neglect assessment (VAN)

Los Angeles Motor Scale (LAMS)

- Facial Droop:
  - Absent: 0
  - Present: 1
- Arm Drift:
  - Absent: 0
  - Drifts Down: 1
  - Falls rapidly: 2
- Grip Strength:
  - Absent: 0
  - Weak grip: 1
  - No grip: 2

LAMS ≥ 4 is severe; potential Large Vessel Occlusion

Rapid Arterial oCclusion Evaluation (RACE)

- Facial palsy:
  - Absent: 0
  - Mild: 1
  - Moderate to severe: 2
- Arm motor impairment:
  - Normal to mild: 0
  - Moderate: 1
  - Severe: 2
- Leg motor impairment
  - Normal to mild: 0
  - Moderate: 1
  - Severe: 2
- Head or gaze deviation:
  - Absent: 0
  - Present: 1
- Aphasia:
  - Absent: 0
  - Mild: 1
  - Severe: 2
- Agnosia:
  - Absent: 0
  - Mild: 1
  - Severe: 2

Score of ≥ 4 should be concerned for a Large Vessel Occlusion

Vision, Aphasia, Neglect (VAN)

- Vision: can they see left, right and up and down
- Aphasia: can they understand and produce speech
- Neglect: are they looking to one side and ignoring the other? Eyes are usually looking to the left or right.

- No need to calculate. If one of the above is positive then consider Large Vessel Occlusion

National Institutes of Health Stroke Scale (NIHSS)

NIHSS

- 11 item scoring system
- Integrates components of neurological exam
  - LOC, select cranial nerves, motor, sensory, cerebellar function, language, inattention (neglect)
- Maximum score: 42, minimum score: 0
- Is a validated tool.

NIHSS

- LOC
- Best gaze
- Visual field testing
- Facial paresis
- Arm & leg motor function
- Limb ataxia
- Sensory
- Best language
- Dysarthria
- Extinction & inattention

NIHSS Rules

- The most reproducible response is generally the first response
- Do not coach patients unless specified in the instructions
- Some items are scored only if definitely present
- Record what the patient does, not what you think the patient can do

Item 1A
Level of Consciousness

Item 1B
Level of Consciousness

Item 1C
Level of Consciousness

Item 2
Best Gaze

Item 3
Visual

Item 4
Facial Palsy

Item 5
Motor Arm

Item 6
Motor Leg

Item 7
Limb Ataxia

Item 8
Sensory

Item 9
Language

Item 10
Dysarthria

Item 11
Extinction and Inattention

NIHSS and Patient Outcomes

- Initial score of 7 was found to be important cut off point
  - NIHSS >7 demonstrated a worsening rate of 65.9%
  - NIHSS <7 demonstrated a worsening rate of 14.8% and were almost twice as likely to be functioning normally at 48 hours (45%)
- NIHSS <5 most strongly associated with D/C home
- NIHSS 6-13 most strongly associated with D/C to rehab
- NIHSS > 13 most strongly associated with D/C to nursing facility

(Schlegel et al., 2003)

- Likelihood of intracranial hemorrhage:
  - NIHSS >20 = 17% likelihood
  - NIHSS <20 =3% likelihood

(Adams et, al., 2003)

- NIH > 6 is often used as the cut off when considering a Large Vessel Occlusion

NIHSS Tips for the patient in a coma, aphasic or confused, or intubated and unresponsive

Category	Score	Coma	Aphasic or confused	Intubated but responsive**
1a. Level of consciousness (alert, drowsy, etc.)	0 1 2 1	3	Standard scoring	Standard scoring-If sedated follow comatose
1b. LOC, questions (month, age)	0 1 2	2	Can write response 2-if patient does not comprehend	1
1c. LOC commands (open eyes, makes fists, let go)	0 1 2	2	Ask and pantomime	Standard scoring
2. Best Gaze (Eyes open-patient follows examiner's finger or face)	0 1 2	Exam with doll's eyes maneuver	Establish eye contact-move around bed. Examine with dolls eyes.	Standard scoring

** If intubated patient is sedated or unresponsive follow the comatose tips

NIHSS Tips for the patient in a coma, aphasic or confused, or intubated and unresponsive

Category	Score	Coma	Aphasic or confused	Intubated but responsive
3. Visual Introduced visual stimulus/threat to patient's visual field quadrants)	0 1 2 3	Threat exam	Test visual quadrants-point to fingers moving. Score 0 if points or looks at moving fingers	Threat exam
4. Facial Palsy (show teeth, raise eyebrows, and squeeze eyes shut)	0 1 2 3	3	Ask and Pantomime or noxious stimuli	Standard scoring
5. Motor Arm (Elevate extremity to 90° & score drift/movement) Only score UN if amputation or joint fusion	0 1 2 3 4 UN	4	Put arm in starting position-encourage them to hold it up	Standard scoring

NIHSS Tips for the patient in a coma, aphasic or confused, or intubated and unresponsive

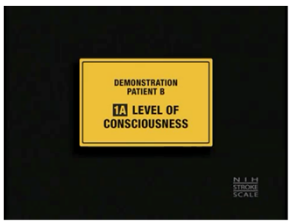
Category	Score	Coma	Aphasic or confused	Intubated but responsive
6. Motor Leg (elevate extremity to 30° & score drift/movement) Only score UN if amputation or joint fusion	0 1 2 3 4 UN	4	Put leg in starting position-encourage them to hold it up	Standard scoring
7. Limb Ataxia (Finger-nose, heel down shin)	0 1 2	0 untestable	Move limb passively to show patient. Score 0 if unable to understand	Standard scoring
8. Sensory (Pin prick to face, arm, trunk and leg-compare side to side)	0 1 2	2	Use painful stimuli, observe reaction	Standard scoring

NIHSS Tips for the patient in a coma, aphasic or confused, or intubated and unresponsive

Category	Score	Coma	Aphasic or confused	Intubated but responsive
9. Best language (Name item, describe picture, and read sentences)	0 1 2 3	3	0-normal 1-abnormal but understandable 2-Incoherent-listener carries burden of communication 3-mute or no usable speech and not following commands	Ask patient to write
10. Dysarthria (Evaluate speech clarity by patient repeating listed words	0 1 2 UN	2	0-Normal articulation 1-slurs but understandable 2-slurs unintelligibly UN-intubated/physical barrier	Untestable
11. Extinction and inattention (Use prior testing to identify or simultaneous stimuli	0 1 2	2	Ask patient to point-left, right, or both	Standard scoring

Lets Practice!

Practice Patient #1



Practice Patient #2

Free NIHSS Certification

- www.stroke.org
  - We can help tab
  - Healthcare professionals-improve your skills
  - Tools, training and resources tab
  - Training tab
  - NIH stroke scale

References

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