NIH Stroke Scale

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Introduction

• The NIHSS is a 15 item neurologic examination that provides a quantitative measure of stroke-related neurologic deficit. (Maximum score of 42)

• The stroke scale is valid for predicting lesion size and can serve as a measure of stroke severity.

• Originally developed as a research tool to measure baseline data in patients in acute stroke clinical trials. Now, it is used as a clinical assessment tool to evaluate the acuity of stroke patients, determine appropriate treatment, and predict patient outcome.
Introduction

• To ensure reliability and reproducibility of results, examiner-patient interactions should be as uniform as possible.

• Administer the stroke scale in the exact order.

• Avoid coaching the patient.

• Accept the patient’s first effort.

• Score only what the patient DOES, not what you think they can do.

• Include all deficits in scoring, even those from prior strokes.
NIH STROKE SCALE

Patient Identification

Pt Date of Birth / / 

Hospital ( )

Date of Exam / / 

Interval: [ ] Baseline [ ] 2 hours post treatment [ ] 24 hours post onset of symptoms ± 20 minutes [ ] 7-10 days [ ] 3 months [ ] Other ( )

Time: [ ] am [ ] pm

Person Administering Scale

Administer stroke scale items in the order listed. Record performance in each category after each subscale exam. Do not go back and change scores. Follow directions provided for each exam technique. Scores should reflect what the patient does, not what the clinician thinks the patient can do. The clinician should record answers while administering the exam and work quickly. Except where indicated, the patient should not be coached (i.e., repeated requests to patient to make a special effort).

Instructions

Scale Definition

Score

1a. Level of Consciousness: The investigator must choose a response if a full evaluation is prevented by such instances as an encephalitic state, language barrier, encephalitis, etc. A 3 is scored only if the patient makes no movement other than reflexive posturing in response to noxious stimulation.

Score

0 = Alert, briefly responsive.
1 = Not alert; but amenable by minor stimulation to obey, answer, or respond.
2 = Not alert; requires repeated stimulation to attend, or is unroused and requires strong or painful stimulation to make movements (not stereotyped).
3 = Responds only with reflex motor or autonomic effects or totally unresponsive, fixed, and vacant.

1b. LOC Questions: The patient is asked the month and year of birth. The answer must be correct. There is no partial credit for being close. Aphasic and stuporous patients who do not comprehend the questions will score 0. Patients unable to speak because of encephalic insufficiency, transtemporal trauma, severe dysarthria from any cause, language barrier, or any other problem not secondary to aphasia are given a 3. It is important that only the initial answer be graded and that the examiner not "help" the patient with verbal or nonverbal cues.

Score

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

1c. LOC Commands: The patient is asked to open and close the eyes and then to grip and release the nonweight-bearing hand. Subordinates another one step command if the hand cannot be used. Credit is given if an unbiased attempt is made but not completed due to weakness. If the patient does not respond to command, the test should be demonstrated to him or her (persuasively) and the result recorded (i.e., follows name, one or two commands). Patients with trauma, amnesia, or other physical impairments should be given some one-step command. Only the first attempt is scored.

Score

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

2. Best Gaze: Only horizontal eye movements will be tested. Voluntary or reflex (pupillary) eye movements will be scored, but caloric testing is not done. If the patient has a conjugate deviation of the eyes that can be eneircified by voluntary or reflexive activity, the score will be 0. If the patient has an isolated peripheral nerve palsy (OH III, IV, or VI), score 1. Oculo is testable in all aphasic patients. Patients with oculomotor, abducens, or pre-existing blindness, or other disorder of visual stimuli or fields should be tested with reflexive movements, and a choice made by the investigator.

Score

0 = Normal.
1 = Partial gaze palsy: gaze is abnormal in one or both eyes, but fixation deviation or total gaze paresis is not present.
2 = Fixed deviations, or total gaze paresis not eneircified by the ophthalmoscope maneuver.
1a – Level of consciousness

• Can assess this while taking the history from the patient
  • Ask 2-3 questions about the situation

• If not alert, try to get the patient to attend, obey, or respond with non-noxious stimuli. (E.g. patting, tapping the patient)

• If non-noxious stimuli doesn’t work, resort to noxious stimuli. (E.g. Nail bed pinching, sternal rub)
1a – Level of Consciousness

• 0 – Alert

• 1 – Not alert, but arousable by minor stimulation to obey, answer, or respond.

• 2 – Not alert, requires repeated stimulation to attend. Or, obtunded and requires strong, painful, or noxious stimuli to make movements.

• 3 – Makes only reflexive posturing movements to repeated painful stimuli. Or, they are totally unresponsive. These patients are in a coma.
  • In patients in a coma who score less than 3, all items in the NIHSS must be attempted. However, most likely will have to fall back on the predefined values for coma patients.
1b – LOC Questions

• Ask the current month and the patient’s age.
• Because this is a standardized test and in order to ensure reproducibility of results, other questions are not asked.
• You can have patients who are not speaking try to write down their answers.
1b – LOC Questions

• 0 – Answered both questions correctly

• 1 – Answered one correctly
  • People unable to communicate because of intubation, orotracheal trauma, severe dysarthria from any cause, language barrier, or any other problem not secondary to aphasia

• 2 – Answered neither question correctly
  • Comatose patients
  • Aphasic and stuporous patients who don’t comprehend the questions
1c – LOC Commands

• Ask the patient to open/close the eyes and make a fist/relax the non-paretic hand.

• Can say the command verbally and pantomime the command.

• You can repeat the command once, but do not coach or encourage the patient.

• Give credit if a real attempt is made to follow the command, but cannot be completed due to weakness.

• If dealing with a patient with trauma, amputation, or other physical impediments, substitute other 1 step commands.
1c – LOC Commands

• 0 – Performed both correctly
• 1 – Performed one correctly
• 2 – Performed neither correctly
2 – Best Gaze

- Tests the horizontal eye movements
  - Does NOT measure disorders of vertical gaze, nystagmus, or skewed deviation
- Observe the eyes at rest. Watch for any spontaneous movements to the right or left.
- Next, have the patient track your finger.
- If he won’t track your finger, try to have him track your face. Establish eye contact and move from one side of the patient to the other.
- If he still won’t track, perform the oculocephalic maneuver. Do NOT perform caloric testing.
  - Comatose patients
  - Patients with ocular trauma, bandages, pre-existing blindness, or other disorders of visual acuity/fields
2- Best Gaze

• 0 – Normal
  • Patients with strabismus who leave the midline and try to look right and left

• 1 – Partial gaze palsy - Conjugate gaze deviation that can be overcome with voluntary or reflexive activity
  • Isolated cranial nerve (III or VI) palsy

• 2- Forced deviation – Cannot be overcome by oculocephalic
3 – Visual

- Tests the visual fields of both eyes
- Test each eye independently. Make sure the patient is looking directly at your eyes.
- Each quadrant is tested by confrontation
  - Can check finger counting or response to movement or threat
- Double simultaneous visual stimulation is performed at this point. Results are used to answer Item 11.
- If patients are unable to respond verbally, check for any response to stimuli in all 4 quadrants.
- If there is unilateral blindness or enucleation, visual fields are tested in the other eye.
3- Visual

- 0 – No visual loss
  - Patients with monocular vision loss from intrinsic eye disease, but intact fields in the other eye

- 1 – Partial Hemianopia
  - Patients who extinguish on double simultaneous visual stimulation

- 2 - Complete Hemianopia

- 3 – Bilateral Hemianopia
  - Blindness from any cause
4 – Facial Palsy

• Verbally ask and pantomime to the patient to show teeth, close the eyes, and raise the eyebrows.

• For the aphasic, poorly responsive patient, use noxious stimuli and evaluate for symmetry of the grimace.

• In the case of facial trauma, remove bandages, tape, or other physical barriers that might obscure the face.

• Tips: Ask yourself if the patient is clearly normal. If yes, score a zero. If no, ask yourself if the patient has definite clear cut asymmetry of the smile. If yes, score a 2.
4 – Facial Palsy

• 0 – Normal

• 1 – Minor paralysis such as flattened nasolabial fold or MILD asymmetry while smiling
  • Patients who are less than CLEARLY normal

• 2 – Partial paralysis (total or near total paralysis of lower face) – indicates upper motor neuron facial weakness

• 3 – Complete paralysis of upper and lower face
  • Comatose patients
    • Patients with unilateral upper and lower facial weakness have lower motor neuron facial weakness
5– Motor Arm

• Extend the arm at 90 degrees if patient is sitting, 45 degrees if patient is lying down. (Palm is down.)

• Score for drift if the arm falls before 10 seconds while you count out loud. Also, count down with your fingers in full view of the patient.

• You can help the patient by placing the arm at the desired position. Watch for an initial dip when you release the arm. ONLY score abnormal if there is a downward drift after the dip. Start counting as soon as you release the arm.

• Each limb is tested in turn. Begin with the non-paretic arm. Do NOT test both arms simultaneously.

• In case of amputation or joint fusion at the shoulder, this item is NOT scored. Note the reason.

• Use urgency in your voice or pantomime to encourage the aphasic patient. Do NOT use noxious stimuli.

• If the patient has restricted movement due to arthritis or non-stroke related limitations, still obtain a score. Use your best judgment to distinguish between the effect of the stroke and any other cause.
5 – Motor Arm

• 0 – No drift, or arm remains in position for 10 seconds after an initial dip

• 1 – Arm jerks or drifts to an intermediate position without encountering support (such as the bed) before the full 10 seconds.

• 2 – Some effort against gravity, but the arm cannot get to or maintain the proper position and drifts down to the bed before the full 10 seconds.

• 3 – No effort against gravity and the arm falls.

• 4 – No voluntary movement
  • Comatose patients
6 – Motor Leg

- Always test the leg while the patient is supine. Lift the leg to 30 degrees.

- Score for drift if the leg falls before 5 seconds while you count out loud. Also, count down with your fingers in full view of the patient.

- You can help the patient by placing the leg at the desired position. Watch for an initial dip when you release the leg. ONLY score abnormal if there is a downward drift after the dip. Start counting as soon as you release the leg.

- Each limb is tested in turn. Begin with the non-paretic leg. Do NOT test both legs simultaneously.

- In case of amputation or joint fusion at the hip, this item is NOT scored. Note the reason.

- Use urgency in your voice or pantomime to encourage the aphasic patient. Do NOT use noxious stimuli.

- If the patient has restricted movement due to arthritis or non-stroke related limitations, still obtain a score. Use your best judgment to distinguish between the effect of the stroke and any other cause.
6 – Motor Leg

- 0 – No drift, or leg remains in position for 5 seconds after an initial dip
- 1 – Leg jerks or drifts to an intermediate position without encountering support (such as the bed) before the full 5 seconds.
- 2 – Some effort against gravity, but the leg cannot get to or maintain the proper position and drifts down to the bed before the full 5 seconds.
- 3 – No effort against gravity and the leg falls.
- 4 – No voluntary movement
  - Comatose patients
7 – Limb Ataxia

• Assessment for a unilateral cerebellar lesion
• Perform Finger Nose Finger and Heel Shin tests bilaterally
• Test the arms before the legs.
• Test the normal side first.
• Make sure the patient’s eyes are open.
• In the case of a visual field defect, perform the test in the intact visual field.
• If patient is blind, can check upper extremities by having him touch his nose from extended arm position.
• Ataxia is only scored if present and OUT OF PROPORTION to weakness.
• In the case of amputation or joint fusion, can mark this as untestable. Note the reason.
7 – Limb Ataxia

• 0 – Absent
  • Patients who cannot understand
  • Patients who are paralyzed
  • Comatose patients

• 1 – Present in one limb

• 2 – Present in two limbs
8 - Sensory

• Test sensation to pinprick. Should use a safety pin or seamstress pin.

• Apply pinprick to proximal portions of the limbs and ask if the patient feels it. Eyes do not need to be closed. Ask if the patient if he feels any difference between the left and right. To optimize reproducibility, only ask the patient to compare the two sides. Do NOT ask them to distinguish between sharp and dull.

• In aphasic or obtunded patients, check for withdrawal from noxious stimulus.

• Only sensation loss attributed to stroke is scored.
  • Do not test pinprick in the distal limbs because sensation loss from a peripheral neuropathy may confound the response.

• Do NOT test through clothing.

• Score of 2 for severe or total sensory loss should only be given when this can be clearly demonstrated. Therefore, stuporous or aphasic patients will probably score a 0 or 1.
8 - Sensory

• 0 – Normal

• 1 – Mild to moderate sensory loss, patient feels asymmetry between the two sides but is still aware of being touched

• 2 – Severe or total sensory loss, patient is not aware of being touched in the face, arm, and leg
  • Patients with brainstem stroke who have bilateral loss of sensation
  • Patients who are paraplegic and do not respond to noxious stimulus.
  • Comatose patients
9 – Best Language

• Assessment is based on what you have observed in the patient to this point in the exam and his performance with the NIHSS cards (Cookie Jar picture, Naming card, Sentences card)

• If the patient wears glasses, he needs to use them for the exam.

• If visual impairment interferes with testing, you can ask the patient to identify objects placed in his hand. Must also have him produce speech.

• Intubated patient should be asked to write.

• Visually impaired patients often call the feather a leaf and the glove a hand. Score this as normal.

• Hammocks are uncommon outside of the Americas so people from other cultures may not know what they are. Would not mark them down for this.
9 – Best Language
9 – Best Language

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.
9 – Best Language
9 – Best Language

• 0 – No aphasia

• 1 – Mild to moderate aphasia; some obvious loss of fluency or facility of comprehension without significant limitation on ideas expressed or form of expression; examiner would be able to identify the picture or naming card content from the patient’s response

• 2 – Severe aphasia; all communication is fragmentary; great need for inference, questioning, and guessing by the examiner; examiner cannot identify the picture or naming card content from the patient’s response
  • In patients who cannot speak, you can have them point to objects on the card to check comprehension.

• 3 – Mute or global aphasia; Globally aphasic patients have no usable speech or auditory comprehension
  • Patients who do not follow any one step commands and cannot point to objects on the naming card.
  • Comatose patients
10 - Dysarthria

• Tests the articulation and clarity of speech
• Do NOT explain the purpose of the exam
• Have the patient read the NIHSS card
• Aphasic patients can be tested by listening to the speech they produce or by asking them to repeat the words after you read them out loud.
• This is untestable ONLY if the patient is intubated or has other physical barriers to producing speech. Note the reason.
10 - Dysarthria

MAMA
TIP – TOP
FIFTY – FIFTY
THANKS
HUCKLEBERRY
BASEBALL PLAYER
10 - Dysarthria

• 0 – Normal

• 1 – Mild to moderate dysarthria; patient can still be understood

• 2 – Severe dysarthria; patients are either mute or speech is so slurred they cannot be understood out of proportion to any dysphasia that is present
  • Comatose patients
11 – Extinction and Inattention

• Tests for neglect or inattention

• Assess double simultaneous tactile stimulation (already checked double simultaneous visual stimulation)
  • Alternately touch patient’s left or right side and ask which side am I touching
  • After patient responds consistently, touch both sides at once.

• Presence of visual spatial neglect or anosognosia also counts.

• Neglect is scored only if present.
  • Aphasic patient who appears to attend to both sides is scored normal.
11 – Extinction and Inattention

• 0 – Absence of neglect
  • Patients with severe visual loss preventing testing of double simultaneous visual stimulation who have normal testing of double simultaneous tactile stimulation

• 1 – Inattention to one modality only (visual, tactile, auditory, spatial, or personal inattention)

• 2 – Profound hemi-inattention or extinction to more than one modality; Does not recognize own hand or orients only to one side of space
Questions?
References

• http://nihss-english.trainingcampus.net
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