ACUTE STROKE GUIDELINE – UMHS*

Items in bold are quality indicators

Positive Nurse Stroke Screen

- ☐ Last Normal Within 10 hours
- ☐ Start ALICE actions (notify Medical Provider)
- ☐ ID witness and contact info (consider social work assist)

ALICE: (NURSE / TECH)

- ☐ Activate
- ☐ **LABS [including POC glucose & INR (results by 45 minutes)]**
- ☐ IV – at least one(prefer two)
- ☐ **CT head (acquired by 25 minutes)**
- ☐ EKG (after above as time permits)

PHARMACY

- ☐ Get weight from team
- ☐ BP meds if needed
- ☐ Prepare tPA if treatment likely

ED MEDICAL PROVIDER

- ☐ Activate Stroke Team (CLERK)
- ☐ **Acute Stroke Work-up MiChart orders (ORDER SET)**
- ☐ ID witness and contact info (consider social work assist)
- ☐ Inform pharmacy of tPA
- ☐ Brief history (last normal time)
- ☐ NIHSS
- ☐ Complete H&P and start exclusions checklist
- ☐ Manage BP per guideline

STROKE TEAM / NEUROLOGY

- ☐ Focused History/Exam/NIHSS
- ☐ **Review CT (PRIOR to 45 minutes)**
- ☐ Review eligibility
- ☐ Discuss treatment options

ALL (NURSE/STROKE TEAM/ ED MEDICAL PROVIDER)

- ☐ Consensus on treatment plan
- ☐ Update orders based on plan

BY 25 minutes: Discussion between Stroke Team , Pharmacy and ED on treatment plan (tPA, no tPA, IA treatment, or treatment conditional on pending data.)

NURSE - TREATMENT

- ☐ Prepare pump
- ☐ Check BP / neuro status before and after treatment per orders
- ☐ **Bolus (goal < 60 min after arrival) then near immediate infusion**
  - o **Document these times**
- ☐ Be ready with saline chaser and document start time
- ☐ Document infusion end time

STROKE TEAM / NEUROLOGY

- ☐ If treatment – notify stroke unit charge nurse.
- ☐ Additional imaging, if needed
- ☐ Admission orders
- ☐ Review eligibility

*Adapted from AHA guidelines: *Stroke*. 2013;44(3)870-947.

Reviewed: 5-May-2015 by EA

Is the patient a tPA candidate?

If yes or possible, discuss potential treatment with pharmacy.

If not, document reason why not *in the Stroke Navigator*.

Inclusions
Diagnosis of ischemic stroke causing measurable neurological deficit
Age greater than 18
Time of symptom onset to potential treatment 0-180 minutes
Time of symptom onset to potential treatment 181-270 minutes (additional exclusions shaded)*

Exclusions[#]	Yes	No
1. Significant head trauma or prior stroke in previous 3 months		
2. Symptoms suggest subarachnoid hemorrhage		
3. History of arterial puncture at a non-compressible site within the previous 7 days		
4. History of previous intracranial hemorrhage		
5. History of intracranial neoplasm, arteriovenous malformation or aneurysm		
6. Recent intracranial or intraspinal surgery		
7. Elevated blood pressure (systolic >185mm Hg or diastolic >110mm Hg)		
8. Active internal bleeding		
9. Acute bleeding diathesis, including, but not limited to:		
a. Platelet count < 100,000/mm3[†]		
b. Use of heparin in the previous 48 hours, resulting in abnormally elevated aPTT greater than the upper limit of normal		
c. Current use of anticoagulant with INR > 1.7 or PT >15[††]		
d. Current use of direct thrombin inhibitors (e.g. dabigatran) or factor Xa inhibitors (e.g. rivaroxaban, apixaban) with elevated sensitive laboratory tests (such as aPTT, INR, platelet count, and ECT; TT; dabigatran level; or appropriate factor Xa activity assays) [††]		
10. Blood glucose < 50mg/dl		
11. CT demonstrates multilobar infarction (hypodensity >1/3 cerebral hemisphere)		
Relative Contraindications Under some circumstances patients may receive IV tPA despite one or more relative contraindications. Consider risk to benefit ratio for IV tPA if these relative contraindications are present:		
12. Only minor or rapidly improving stroke symptoms (clearing spontaneously)		
13. Pregnancy		
14. Seizure at onset with postictal residual neurological impairments		
15. History of major surgery or serious trauma within the preceding 14 days		
16. Recent gastrointestinal or urinary tract hemorrhage (within previous 21 days)		
17. History of acute MI in previous 3 months?		
18. Aged > 80 years		
19. Severe stroke (NIHSS >25)		
20. Taking an oral anticoagulant regardless of INR		
21. History of both diabetes and prior ischemic stroke		

Adapted from AHA guidelines: *Stroke*. 2013;44(3)870-947. While recognizing that the alteplase package insert was updated in February 2015, our general practice is to follow the recommendations in the AHA guidelines.

*Treatment with IV tPA between 3 and 4.5 hours has not been approved by the FDA and is an off-label use for the treatment of acute ischemic stroke. Data from the ECASS 3 study supports the treatment of selected patients within this time frame.

#A physician with expertise in acute stroke care may modify this list.

† In patients without history of thrombocytopenia, treatment with IV tPA can be initiated before availability of platelet count but should be discontinued if platelet count is <100,000/mm^3

††If there is no clinical suspicion of abnormal coagulation laboratories, IV rtPA may be initiated before the availability of coagulation study results but should be discontinued if INR > 1.7 or the PT/PTT is elevated by local laboratory standards. For patients taking direct thrombin inhibitors or factor Xa inhibitors, it may be reasonable to administer IV tPA if history can be obtained that the patient has not received a dose of these agents for >48 hours AND has normal renal function.

National Institutes of Health Stroke Scale (NIHSS) Score Sheets and Instructions

Administer stroke scale items in the order listed. Record performance in each category after each exam.
Follow directions provided for each exam technique.

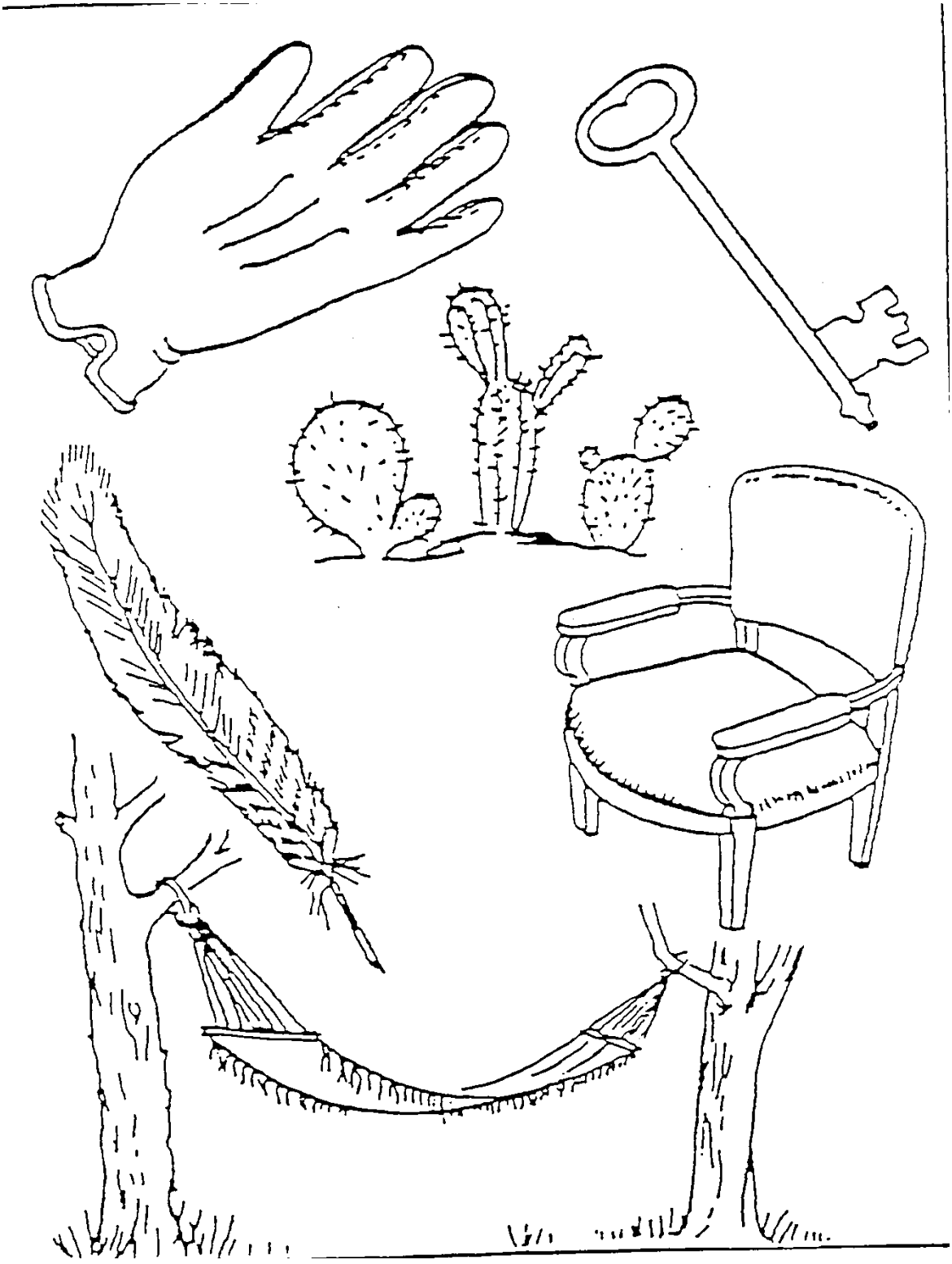
INSTRUCTIONS	SCALE DEFINITION	SCORE	SCORE
1a. **Level of Consciousness (LOC):** The physician must choose a response even if a full evaluation is prevented by such obstacles as an endotracheal tube, language barrier or orotracheal trauma/bandages. A 3 is scored only if the patient makes no movement (other than reflexive posturing) in response to noxious stimulation.	0 = Alert; keenly responsive. 1 = Not alert. but arousable by minor stimulation to obey. answer. or respond. 2 = Not alert, requires repeated stimulation to attend, or is obtunded and requires strong or painful stimulation to make movements (not stereotyped). 3 = Responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, areflexic.		
1b. **LOC Questions**: The patient is asked the month and his/her age. 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 2. Patients unable to speak because of endotracheal intubation, orotracheal trauma, severe dysarthria from any cause. language barrier or any other problem not secondary to aphasia are given a 1. It is important that only the initial answer be graded and that the examiner not help the patient with verbal or non-verbal cues.	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 non-paretic hand. Substitute another one step command if the hands cannot be used. Credit is given if an unequivocal attempt is made but not completed due to weakness. If the patient does not respond to command. the task should be demonstrated to them (PANTOMIME) and score the result (i.e., follows none, one or two commands). Patients with trauma, amputation, or other physical impediments should be given suitable one-step commands. Only the first attempt is scored.	0 = Performs both tasks correctly. 1 = Performs one tasks correctly. 2 = Performs neither task correctly.		
2. **Best Gaze:** Only horizontal eye movements will be tested. Voluntary or reflexive (oculocephalic) eye movements will be scored but caloric testing is not done. If the patient has a conjugate deviation of the eyes that can be overcome by voluntary or reflexive activity the score will be 1. If a patient has an isolated peripheral nerve paresis (CN Ill, IV OR VI) score a 1. Gaze is testable in all aphasic patients. Patients with ocular trauma. bandages, pre-existing blindness or other disorder of visual acuity or fields should be tested with reflexive movements and a choice made by the physician. Establishing eye contact and then moving about the patient from side to side will occasionally clarify the presence of a partial gaze palsy.	0 = Normal. 1 = Partial gaze palsy. This score is given when gaze is abnormal in one or both eyes, but where forced deviation or total gaze paresis are not present. 2 = Forced deviation, or total gaze paresis not overcome by the oculocephalic maneuver.		
3. **Visual:** Visual fields are tested by confrontation, using finger counting or visual threat as appropriate. Patient must be encouraged, but if they look at the side of the moving fingers appropriately, this can be scored as normal. If there is unilateral blindness or enucleation, visual fields in the remaining eye are scored. Score only if a clear-cut asymmetry, including quadrantanopia is found. If patient is blind from any cause score 3. Double simultaneous stimulation is performed at this point. If there is extinction patient receives a 1 and the results are used to answer question 1.	0 = No visual loss. 1 = Partial hemianopia. 2 = Complete hemianopia. 3 = Bilateral hemianopia (blind including cortical blindness).		
4. **Facial Palsy:** Ask, or use pantomime to encourage the patient to show teeth or smile and close eyes. Score symmetry of grimace in response to noxious stimuli in the poorly responsive or non-comprehending patient. If facial trauma/bandages, orotracheal tube, tape or other physical barrier obscures the face these should be removed to the extent possible.	0 = Normal symmetrical movement. 1 = Minor paralysis (flattened nasolabial fold, asymmetry on smiling). 2 = Partial paralysis (total or near total paralysis of lower face). 3 = Complete paralysis absence of facial movement in the upper and lower face).		

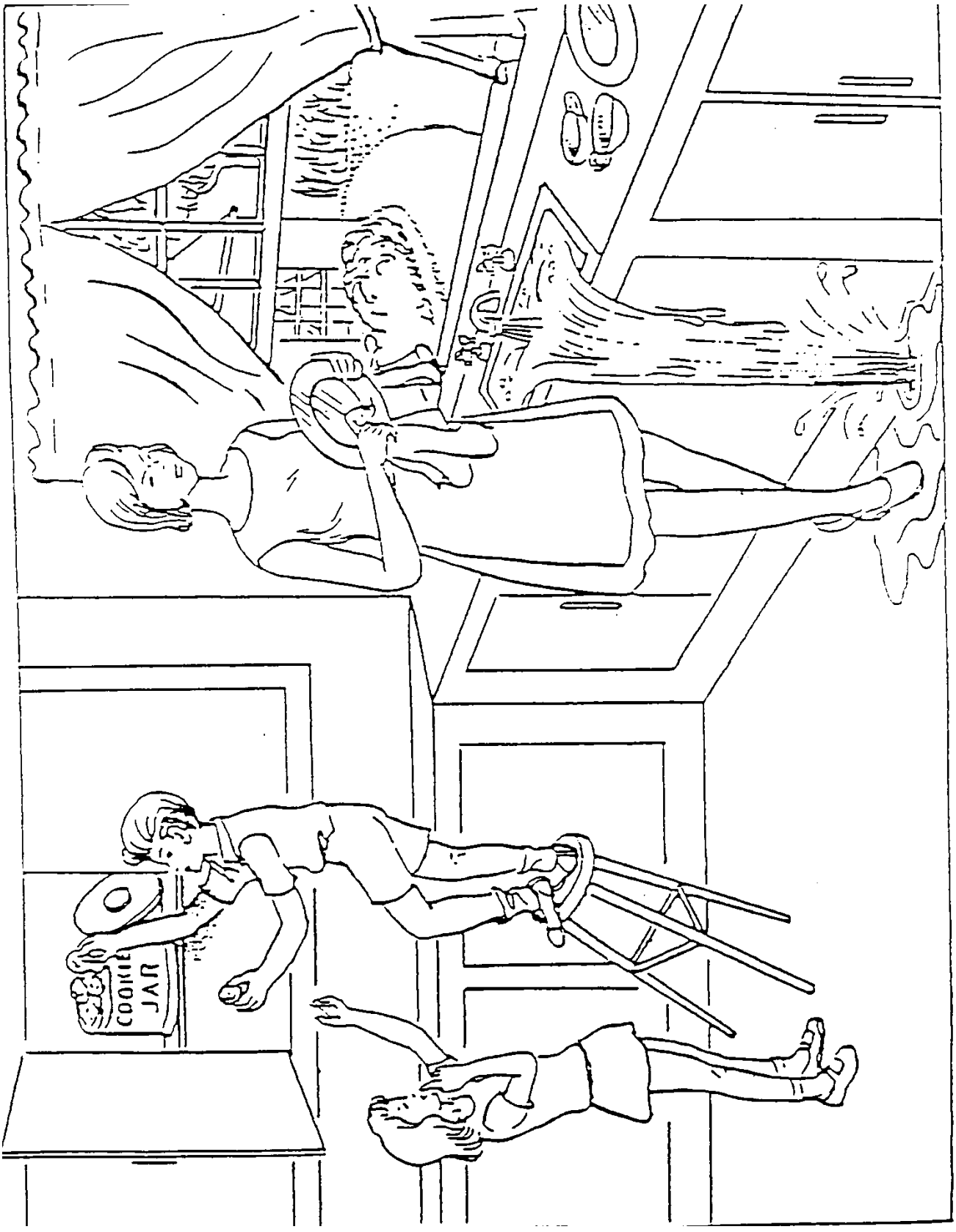
The National Institutes of Health Stroke Scale (NIHSS) cont.

INSTRUCTIONS	SCALE DEFINITION	SCORE	SCORE
5. **Motor Arm:** Extend the arms 90 degrees (if sitting) or 45 degrees (if supine). Drift is scored if the arm falls before 10 seconds. The aphasic patient is encouraged using urgency in the voice and pantomime but not noxious stimulation. Each limb is tested in turn, beginning with the non-paretic arm. Score each limb separately.	0 = No drift. Limb holds 90 (or 45) degrees for full 10 seconds. 1 = Drift. Limb holds 90 (or 45) degrees, but drifts down before full 10 seconds; does not hit bed or other support. 2 = Some effort against gravity, limb cannot get to or maintain (if cued) 90 (or 45) degrees, drifts down to bed but has some effort against gravity. 3 = No effort against gravity, limb falls. 4 = No movement **5a. LEFT ARM** **5b. RIGHT ARM**	5a.____ 5b.____	5a.____ 5b.____
6. **Motor Leg**: Extend the leg 30 degrees (always tested with patient supine). Drift is scored if the leg falls before 5 seconds. The aphasic patient is encouraged using urgency in the voice and pantomime but not noxious stimulation. Each limb is tested in turn, beginning with the non-paretic arm. Score each limb separately.	0 = No drift. Limb holds 30 degrees for full 5 seconds. 1 = Drift. Limb holds 30 degrees, but drifts down before full 5 seconds; does not hit bed or other support. 2 = Some effort against gravity, limb cannot get to or maintain (if cued) 30 degrees, drifts down to bed but has some effort against gravity. 3 = No effort against gravity, limb falls. 4 = No movement **6a. LEFT LEG** **6b. RIGHT LEG**	6a.____ 6b.____	6a.____ 6b.____
7. **Limb Ataxia:** This item is aimed at finding evidence of a unilateral cerebellar lesion. Test with eyes Open. In case of visual defect, insure testing is done in intact visual field. The finger-nose-finger and heel-shin tests are performed on both sides and ataxia is <u>scored only if present out of proportion to weakness</u>. <u>Ataxia is absent in the patient who cannot understand or is hemiplegic.</u>	0 = Absent. 1 = Present in one limb. 2 = Present in two limbs.		
8. **Sensory:** Sensation or grimace to pinprick when tested, or withdrawal from noxious stimulus in the obtunded or aphasic patient. Only sensory loss attributed to stroke is scored as abnormal and the examiner should test as many body areas (limbs, trunk, face) as needed to accurately check for hemisensory loss. A score of 2, "severe or total", should only be given when a severe or total loss of sensation can be clearly demonstrated. Stuporous and aphasic patients will therefore probably score 1 or 0. The patient with a brainstem stroke who has bilateral loss of sensation is scored 2. If the patient does not respond and is quadriplegic score 2. Patients in coma (item 1a = 3) are arbitrarily given a 2 on this item.	0 = Normal; no sensory loss. 1 = Mild to moderate sensory loss; patient feels pinprick is less sharp or is dull on the affected side; or there is a loss of superficial pain with pinprick but patient is aware he/she is being touched. 2 = Severe total sensory loss; patient is not aware of being touched in the face, arm, and leg.		

The National Institutes of Health Stroke Scale (NIHSS) cont.

INSTRUCTIONS	SCALE DEFINITION	SCORE	SCORE
9. **Best Language:** A great deal of information about comprehension will be obtained during the preceding sections of the examination. The patient is asked to describe the attached picture, to name the items on the attached naming sheet, and to read from the attached list of sentences. Comprehension is judged from responses here as well as to all of the commands in the preceding general neurological exam. If visual loss interferes with the tests ask the patient to identify objects placed in the hand, repeat. and produce speech. The intubated patient should be asked to write. The patient in coma (question 1 a - 3) will arbitrarily score 3 on this item. The examiner must choose a score in the patient with stupor or limited cooperation but a score of 3 should be used only if the patient is mute and follows no one step commands.	0 = No aphasia, normal. 1 = Mild to moderate aphasia; some obvious loss of fluency or facility of comprehension. without significant limitation on ideas expressed or form of expression. Reduction of speech and/or comprehension, however, makes conversation about provided material difficult or impossible. For example in conversation about provided materials examiner can identify picture or naming card from patient's response. 2 = Severe aphasia; all communication is through fragmentary expression; great need for inference. questioning. and guessing by the listener. Range of information that can be exchanged is limited; listener carries burden of communication. Examiner cannot identify materials provided from patient response. 3 = Mute, global aphasia; no usable speech or auditory comprehension.		
10. **Dysarthria**: If patient is thought to be normal an adequate sample of speech must be obtained by asking patient to read or repeat words from the attached list. If the patient has severe aphasia, the clarity of articulation of spontaneous speech can be rated.	0 = Normal. 1 = Mild to Moderate: patient slurs at least some words and, at worst, can be understood with some difficulty 2 = Severe: patient's speech is so slurred as to be unintelligible in the absence of, or out of proportion to, any dysphasia, or is mute/anarthric .		
11. **Extinction and Inattention (formerly Neglect):** Sufficient information to identify neglect may be obtained during the prior testing. If the patient has a severe visual loss preventing visual double simultaneous stimulation, and the cutaneous stimuli are normal, the score is normal. If the patient has aphasia but does appear to attend to both sides, the score is normal. The presence of visual or spatial neglect or anosognosia may also be taken as evidence of abnormality. Since the abnormality is scored only if present the item is never untestable.	0 = No abnormality. 1 = Visual, tactile, auditory, spatial or personal inattention. Extinction to bilateral simultaneous stimulation in one of the three sensory modalities. 2 = Profound hemi-inattention or hemi-inattention to more than one modality. Does not recognize own hand or orients to only one side of space.		
	TIME		
	TOTAL SCORE		




COOKIE
JAR

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.

MAMA

TIP - TOP

FIFTY - FIFTY

THANKS

HUCKLEBERRY

BASEBALL PLAYER

Reviewed: 5-May-2015 by EA

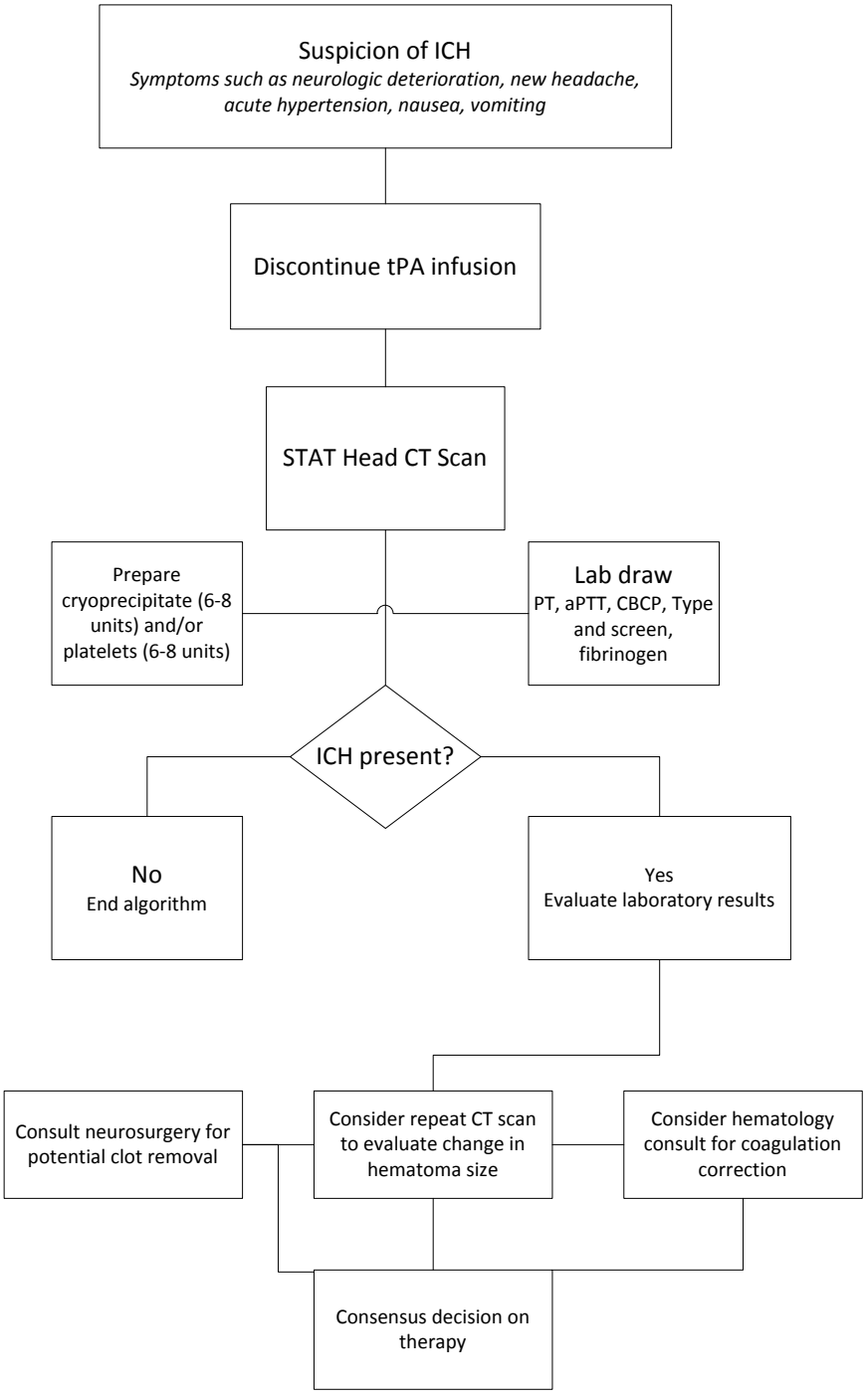
Time goals
If IV tPA is going to be administered, it should be given as soon as possible.

Door to physician	≤10 minutes
Door to stroke team	≤15 minutes
Door to CT initiation	≤25 minutes
Door to CT interpretation	≤45 minutes*
Door to drug (≥80% compliance)	≤60 minutes
Door to stroke unit admission	≤3 hours

*For stroke patient eligible for thrombolysis, the CT will be read as the scan is in progresses or immediately after the scan has been completed by a member of the stroke team or a neurology resident in addition to the radiology read.

Reminder: vital signs and neuro-checks after treatment
q15 minutes for 2 hours, then
q30 minutes (+/- 5 minutes) for 6 hours, then
q60 minutes (+/- 10 minutes) for 16 hours

Management of Suspected ICH



Reviewed: 5-May-2015 by EA

UNIVERSITY OF MICHIGAN HOSPITALS & HEALTH CENTERS **Request and Consent to Medical, Surgical, Radiological or Other Procedures**	NAME: MRN: BIRTHDATE: CSN:

ENTER PATIENT INFORMATION or APPLY PATIENT LABEL TO ALL PAGES

1. I have spoken with my doctors. They have explained my diagnosis and condition (listed on page 2).
2. My doctors have recommended the procedures listed on page 2 to diagnose or treat my condition. They have explained the **POTENTIAL BENEFITS** of these procedures. They also have explained the **RISKS OF REFUSING** the procedures.
3. My doctors have explained the **RISKS OF THE PROCEDURES** and I understand them. The major risks are listed on page 2.
4. I understand the planned location of my procedures may be marked on my body before the procedures. It may also be marked on the diagrams on page 2.
5. I understand that if I am given **ANESTHESIA OR SEDATION ANALGESIA** there will be other risks. These risks include severe blood loss, infection, damage to teeth, mouth, throat, or vocal cords, nerve or eye damage, drug reaction, slowing or stopping of breathing, failure of the anesthetic or sedation analgesia, cardiac arrest, risks that cannot be predicted, permanent disability or even death. There may be other unknown risks. I understand these risks and I consent to the use of any anesthetic or sedation analgesia that my doctors or the anesthetists believe is necessary.
6. I understand that **blood and urine specimens** may need to be collected in order to determine my care. If I am a woman of childbearing age, this may include a **pregnancy test**.
7. My doctors have explained the **ALTERNATIVES** to the recommended procedures and their risks. I want to have the recommended procedures.
8. I understand that sometimes during a procedure or afterwards (for example if I am in an intensive care unit), my doctors may decide that **RELATED OR ADDITIONAL PROCEDURES** are also necessary. I request and authorize the University of Michigan and the providers responsible for my treatment to perform any necessary additional procedures.
9. I **DONATE** and authorize the University of Michigan to own, use, retain, preserve, manipulate, analyze, or dispose of any **excess tissues, specimens, or parts of organs** that are removed from my body during the procedures described above and are not necessary for my diagnosis or treatment. The University of Michigan may use or retransfer these items to any entity for any lawful purpose, including education and retrospective research on anonymous specimens.
10. I request and authorize the University of Michigan and any **doctors, nurses, medical residents and other trainees, technicians, assistants or others** who may be assigned to my case to participate in my diagnosis and treatment. I understand that **representatives of companies** that sell equipment used in my procedures may also be present and participate. I also understand that the University of Michigan is a teaching institution. Medical and other students can and do participate in procedures as part of their education. By signing this form, I agree to allow these students to participate in my procedures. This may include performing **exams under anesthesia** that are relevant to my procedures.
11. I understand that unexpected events may happen before or during a surgery or procedure. This may require changing the providers originally scheduled to perform or supervise my procedures.
12. I understand that the practice of medicine, surgery and dentistry is not an exact science. I have been told about the probability of success of the procedures. **NO PROMISES OR GUARANTEES** have been made or can be made to me about the success, outcomes, or side effects of the procedures.
13. I have been given a chance to ask questions about the procedures and this form and my questions have been answered.

List any exceptions under the Exceptions section located on page 2.

NOTE: Image ALL PAGES or send ALL PAGES to Health Information Management – including pages without a signature section

UNIVERSITY OF MICHIGAN HOSPITALS & HEALTH CENTERS	NAME:
Request and Consent to Medical, Surgical, Radiological or Other Procedures	MRN:
	BIRTHDATE:
	CSN:

ENTER PATIENT INFORMATION or APPLY PATIENT LABEL TO ALL PAGES

1. My diagnoses/conditions are:
   Stroke due to blockage of blood vessel in brain or clot within vessel
2. My recommended procedures are:
   Treatment with intravenous thrombolysis (clot buster) For every 100 patients treated, about 13 additional (around 8 if treated later and around 20 if treated very early) will avoid disability. In addition, fewer patients will end up dependent on others if treated. The chance of dying from stroke similar with or without treatment.

   My procedures have been explained by: _____ ID#: _____

   My procedures will be performed or supervised by: _____ ID#: _____
3. My risks include:
   1. Bleeding into the brain leading to worse disability or death (Between 1 and 6 out of 100 treated patients are worse off)
   2. Internal bleeding (into stomach or intestines or other locations)
   3. Nausea and/or vomiting 4. Low blood pressure 5. Allergic reactions (swelling of tongue or face)
   6. Rash 7. Fever

4. I understand the approximate location of my procedure or surgical incision will be marked on my body prior to the procedure unless it is considered to be an excluded site below. For illustrative purposes, the approximate operative site may be marked on the diagrams provided.

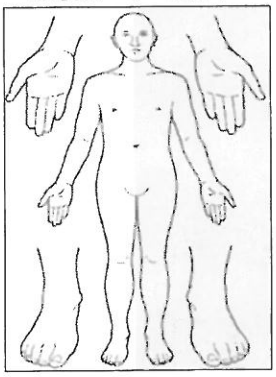
I CONSENT TO THE FOLLOWING:
PROCEDURE(S)

☐ I consent to the procedure(s) listed in #2 above (please initial)

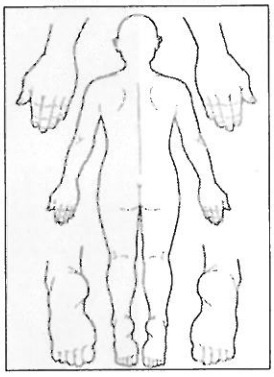
Initial the appropriate box: I consent to a pregnancy testing (if appropriate). ☐ Yes ☐ No

Exceptions (TO BE COMPLETED BY PROVIDER ONLY):

RIGHT / LEFT



LEFT / RIGHT



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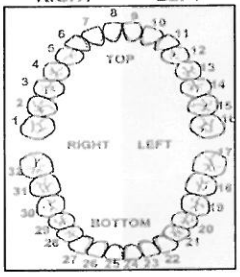

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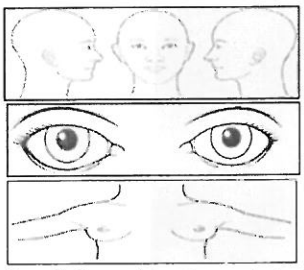

I HAVE READ AND UNDERSTAND THE INFORMATION ON THIS FORM AND ON THE PREVIOUS PAGES BEFORE I SIGNED IT.

_____
Signature of Patient or Legally Authorized Representative (if patient is a minor or unable to sign)

_____
Printed Name of Legally Authorized Representative (if patient is a minor or unable to sign)

Relationship: ☐ Spouse ☐ Parent ☐ Next-of-Kin ☐ Legal Guardian ☐ DPOA for Healthcare

_____
Consent Obtained, Explained and Witnessed by:

Date: _____ **Time:** _____ **A.M. / P.M.**
(mm/dd/yyyy)

☐ Excluded Sites: Check here if the operative site is considered an excluded site.
Excluded sites are as follows:

- Mid-line sternotomy for a non-sided organ (e.g., CABG)
- Cesarean deliveries
- Surgery through a body orifice that does NOT involve laterality of the organ (e.g., Cystoscopy)
- Laparotomy, laparoscopy that does NOT involve laterality of the organ (e.g., splenectomy, laparoscopic cholecystectomy)
- Interventional procedures for which the site of insertion is NOT predetermined, such as cardiac catheterization procedures, angiography, and dialysis catheters
- Breast biopsy with wire localization
- Intra-oral and dental procedures
- Premature infants, for whom the mark may cause a permanent tattoo
- Marking for superficial cosmetic procedures using lasers (or similar energy-based devices) or injectables (such as neurotoxins and soft tissue fillers) when there are multiple sites and/or when marking would be impractical or pose a potential adverse outcome to the procedure.

30-10000	VER: A/13 HIM: 04/13	Original – Medical Record Copy – Patient/Family	M University of Michigan Hospitals and Health Centers	Request and Consent to Medical, Surgical, Radiological or Other Procedures

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