INITIAL ASSESSMENT

- STAT finger stick glucose and troponin
- STAT 12-lead EKG
- Inform radiology that patient has a possible acute ischemic stroke
- STAT CT head without contrast
- Consult Neurology and either Case Manager or Off Shift Administrator (OSA) for possible transfer to stroke unit
- Obtain a CBC, PT/INR, aPTT as soon as possible without delaying brain imaging
- Obtain urine pregnancy test if appropriate
- Supplemental oxygen to maintain oxygen saturation > 94%

NIHSS = National Institutes of Health Stroke Scale

1 Signs and symptoms of acute ischemic stroke:
   - Numbness and/or paralysis to face, arm or leg (especially on one side)
   - Sudden confusion
   - Trouble seeing in one or both eyes

2 See Appendix A for NIHSS

3 Physician may make the determination prior to Neurology consult to prevent any transfer delays especially for patients in the Mays Clinic and Emergency Center. Time permitting, Neurology may assist with determining if a patient is a candidate for endovascular intervention for large vessel occlusion at a stroke center.

4 Neurology to determine if alteplase should be given at MD Anderson Cancer Center prior to transfer depending on transfer process time

5 If transfer physician or Neurology determines patient has a contraindication for thrombolysis, and there are no contraindications for aspirin, may give aspirin 325 mg PO prior to transfer

Management of Acute Ischemic Stroke in Adult Patients

Department of Clinical Effectiveness V8
Approved by The Executive Committee of Medical Staff on 06/25/2019
EMERGENCY TRANSFER ADMINISTRATIVE PROCESS

Attending Physician will notify Case Management or OSA\(^1\) (outside of business hours) to coordinate acceptance at outside hospital\(^2\)

- Case Management or OSA will:
  - Contact Transfer Center at the receiving hospital to obtain approval\(^3\)
  - Seek financial clearance and bed availability
  - Provide attending physician with contact number for physician at outside hospital
- Attending Physician will discuss case with physician at outside hospital

Transfer accepted?

Yes →

- Case Management or OSA will:
  - Identify and coordinate appropriate transportation service to be used
  - Complete the Memorandum of Transfer
  - Ensure proper documentation accompanies patient
  - Notify appropriate nursing unit when the approval to transfer has been obtained along with information such as address and phone numbers for calling clinical report

No →

- Inform patient/family that care will continue at MD Anderson
- Manage patient as clinically indicated

\(^1\) Contact Case Management or OSA via operator

\(^2\) Refer to UTMDACC Institutional Transfer Policy (#CLN0614)

\(^3\) Discuss with Attending Physician regarding preference for receiving hospital based on clinical scenario. See Appendix B: Texas Medical Center (TMC) Hospital Contact Information. If transfer approval is not promptly obtained, Case Management to contact alternate hospitals to avoid delay.

\(^4\) Documentation:
  - “Face sheet”
  - Medical records to include a current reconciled medication list and transfer orders per primary care team
  - Others as appropriate

DISPOSITION
**INITIAL ASSESSMENT**

**Contraindication to thrombolytic therapy**?

- Yes: **Symptom onset < 4.5 hours?**
  - Yes: **BP < 185/110 mmHg?**
    - Yes: **SBP > 185 mmHg or DBP > 110 mmHg**
      - **Labetalol**: 10-20 mg IV over 2 minutes, may repeat once
      - **Nicardipine**: 5 mg/hour IV continuous infusion
    - No: **If no contraindications to aspirin, give aspirin 325 mg**
  - No: **If no contraindications to aspirin, give aspirin 325 mg**

- No: **If no contraindications to aspirin, give aspirin 325 mg**

**BP < 185/110 mmHg?**

- Yes: **If no contraindications to aspirin, give aspirin 325 mg**

**SBP > 185 mmHg or DBP > 110 mmHg** (blood pressure should not be reduced by more than 15%)

- **Do not use if heart rate less than 60 beats per minute**
- **Nicardipine**: 5 mg/hour IV continuous infusion

---

1. For contraindications to Thrombolytic Therapy, see Appendix C
2. Examples of significant comorbidities: severe cardiac failure, aortic dissection, or hypertensive encephalopathy

---

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Patient develops severe headache, acute hypertension, severe nausea and vomiting?

SBP > 180 - 230 mmHg or DBP > 105 - 120 mmHg
- Labetalol 10 mg IV then IV continuous infusion at 2-8 mg/minute (Note: Do not use labetalol if heart rate < 60 beats per minute)
- Nicardipine 5 mg/hour IV continuous infusion. Titrate by 2.5 mg/hour every 5 minutes to desired effect. Maximum dose is 15 mg/hour.

Stop alteplase and obtain STAT CT head without contrast

Stop alteplase and treat allergic reaction (see Adult Hypersensitivity (HSR)/Allergic Reaction Management algorithm)

Yes

No

Patient develops angioedema?

Patient’s BP increases to > 180/105 mmHg?

Maintain strict blood pressure control in the first 24 hours after alteplase administration

Administer alteplase per Acute Ischemic Stroke Order Set

Yes

No

Stop alteplase and obtain STAT CT head without contrast

Stop alteplase and treat allergic reaction

Yes

No

Treat hyperglycemia to maintain glucose in a range of 140 - 180 mg/dL and Avoid hypoglycemia (glucose < 60 mg/dL)

Stress ulcer prophylaxis

Deep vein thrombosis prophylaxis at least 24 hours after alteplase administration

Admit to ICU

Consult benign hematology at this point

1 Consult benign hematology at this point

2 Mechanical and/or pharmacological
APPENDIX A: National Institutes of Health Stroke Scale (NIHSS)

<table>
<thead>
<tr>
<th>Title</th>
<th>Responses</th>
<th>Score</th>
</tr>
</thead>
</table>
| 1A Level of consciousness | 0 – Alert and responsive  
1 – Arousable to minor stimulation  
2 – Arousable to painful stimulation  
3 – Reflex responses or unarousable | |
| 1B Orientation questions  
• Ask patient’s age and month | 0 – Both correct  
1 – One correct (or dysarthria, intubated, foreign language)  
2 – Neither correct | |
| 1C Response to commands  
• Open/close eyes and grip and release hand | 0 – Both correct (ok if impaired by weakness)  
1 – One correct  
2 – Neither correct | |
| 2 Gaze  
• Horizontal extraocular movement | 0 – Normal  
1 – Partial gaze palsy; abnormal gaze in 1 or both eyes  
2 – Forced eye deviation or total paresis | |
| 3 Visual field  
• Use visual threat if necessary | 0 – No visual loss  
1 – Partial hemianopia, quadrantanopia, extinction  
2 – Complete hemianopia  
3 – Bilateral hemianopia or blindness | |
| 4 Facial movement | 0 – Normal  
1 – Minor facial weakness  
2 – Partial facial weakness  
3 – Complete unilateral palsy (upper and lower face) | |
| 5 Motor function (arm) – arms outstretched for 10 seconds  
• Left  
• Right | 0 – No drift before 5 seconds  
1 – Drift but doesn’t hit bed  
2 – Some antigravity effort, but can’t sustain  
3 – No antigravity effort, but even minimal movement counts  
4 – No movement at all  
X – Unable to assess due to amputation, fusion, fracture | Left:  
Right: |

Continued on next page
### APPENDIX A: National Institutes of Health Stroke Scale (NIHSS) - continued

<table>
<thead>
<tr>
<th>Title</th>
<th>Responses</th>
<th>Score</th>
</tr>
</thead>
</table>
| Motor function (leg) – raise leg 30 degrees supine for 5 seconds  
  ● Left  
  ● Right                                    | 0 – No drift before 5 seconds  
  1 – Drift but doesn’t hit bed  
  2 – Some antigravity effort, but can’t sustain  
  3 – No antigravity effort, but even minimal movement counts  
  4 – No movement at all  
  X – Unable to assess due to amputation, fusion, fracture | Left:  
  Right: | Score ≥ 25 | Very severe neurological impairment  
  Score 5-24 | Mild to severe neurological impairment  
  Score < 5 | Mild impairment |
| Limb ataxia  
  ● Check finger-nose-finger; heel-shin; and score if only out of proportion to paralysis | 0 – No ataxia  
  1 – Ataxia in upper or lower extremity  
  2 – Ataxia in upper and lower extremity  
  X – Unable to assess due to amputation, fusion, fracture |  
  | | | |
| Sensory  
  ● Use safety pin                           | 0 – No sensory loss  
  1 – Mild-moderate unilateral loss but pt aware of touch  
  2 – Total loss, patient unaware of touch |  
  | | | |
| Language  
  ● Name objects; use repeating              | 0 – Normal  
  1 – Mild-moderate aphasia  
  2 – Severe aphasia  
  3 – Mute, global aphasia, coma |  
  | | | |
| Articulate  
  ● Read a list of words                     | 0 – Normal  
  1 – Mild-moderate; slurred but intelligible  
  2 – Severe; unintelligible or mute  
  X – Intubation or mechanical barrier |  
  | | | |
| Extinction/neglect  
  ● Simultaneously touch patient on both hands, show fingers in both visual fields, ask about deficit | 0 – Normal, non detected  
  1 – Neglects 1 sensory modality  
  2 – Profound neglect in more than one modality |  
  | | | |
APPENDIX B: Texas Medical Center (TMC) Hospital Contact Information

<table>
<thead>
<tr>
<th></th>
<th>Memorial Hermann TMC</th>
<th>CHI St. Luke’s TMC</th>
<th>Methodist TMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Transfers:</td>
<td>Transfer Center (713) 704-2500</td>
<td>Transfer Center (832) 355-2233</td>
<td>Transfer Center (713) 441-6804</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional contacts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>based on indication:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td>On-call Stroke pager (281) 262-8800</td>
<td>On-call Stroke pager (713) 404-3224</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>On-call Neurointensivist via transfer center</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Vascular bleeding    | Dr. Sunil Sheth (832) 325-7080 (office) | ---                                     | Dr. Orlando Diaz (713) 398-3543 (cell)
|                      |                                        |                                          | (713) 768-0945 (pager)              |
Management of Acute Ischemic Stroke in Adult Patients

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APPENDIX C: Contraindications to Thrombolytic Therapy

<table>
<thead>
<tr>
<th>ABSOLUTE CONTRAINDICATIONS</th>
<th>RELATIVE CONTRAINDICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient history:</td>
<td>• Only minor and isolated neurologic signs or rapidly improving symptoms</td>
</tr>
<tr>
<td>• Ischemic stroke or severe head trauma in the previous 3 months</td>
<td>• Serum glucose &lt; 50 mg/dL (&lt; 2.8 mmol/L)³</td>
</tr>
<tr>
<td>• Previous intracranial hemorrhage</td>
<td>• Serious trauma in the previous 14 days</td>
</tr>
<tr>
<td>• Intracranial neoplasm</td>
<td>• Major surgery in the previous 14 days</td>
</tr>
<tr>
<td>• Gastrointestinal malignancy or hemorrhage in the previous 21 days</td>
<td>• History of gastrointestinal bleeding (remote) or genitourinary bleeding</td>
</tr>
<tr>
<td>• Intracranial or intraspinal surgery within the prior 3 months</td>
<td>• Seizure at the onset of stroke with postictal neurologic impairments⁴</td>
</tr>
<tr>
<td>Clinical:</td>
<td>• Pregnancy</td>
</tr>
<tr>
<td>• Symptoms suggestive of subarachnoid hemorrhage</td>
<td>• Arterial puncture at a noncompressible site in the previous seven days⁵</td>
</tr>
<tr>
<td>• Persistent blood pressure elevation (systolic ≥ 185 mmHg or diastolic ≥ 110 mmHg)</td>
<td>• Large (≥ 10 mm), untreated, unruptured intracranial aneurysm⁶</td>
</tr>
<tr>
<td>• Active internal bleeding</td>
<td>• Untreated intracranial vascular malformation⁵</td>
</tr>
<tr>
<td>• Presentation consistent with infective endocarditis</td>
<td></td>
</tr>
<tr>
<td>• Stroke known or suspected to be associated with aortic arch dissection</td>
<td></td>
</tr>
<tr>
<td>• Acute bleeding diathesis, including but not limited to conditions defined under hematologic Hematologic:</td>
<td></td>
</tr>
<tr>
<td>• Platelet count &lt; 100 K/microliter¹</td>
<td></td>
</tr>
<tr>
<td>• Current warfarin use with an INR &gt; 1.7 or PT &gt; 15 seconds or aPTT &gt; 40 seconds or PT &gt; 15 seconds¹</td>
<td></td>
</tr>
<tr>
<td>• Current use of treatment dose LMWH in the past 24 hours (e.g., to treat VTE and ACS); this exclusion does not apply to prophylactic doses (e.g., to prevent VTE)</td>
<td></td>
</tr>
<tr>
<td>• Current use of direct thrombin inhibitors (dabigatran) or direct factor Xa inhibitors (rivaroxaban, apixaban, and edoxaban) within 48 hours assuming normal renal function²</td>
<td></td>
</tr>
<tr>
<td>Head CT:</td>
<td>ACS = acute coronary syndrome</td>
</tr>
<tr>
<td>• Evidence of hemorrhage</td>
<td>aPTT = activated partial thromboplastin time</td>
</tr>
<tr>
<td>• Extensive regions of obvious hypodensity consistent with irreversible injury</td>
<td>INR = international normalized ratio</td>
</tr>
<tr>
<td></td>
<td>LMWH = low molecular weight heparin</td>
</tr>
</tbody>
</table>

¹Although it is desirable to know the results of these tests, thrombolytic therapy should not be delayed while results are pending unless there is clinical suspicion of a bleeding abnormality or thrombocytopenia, the patient is currently on or has recently received anticoagulants (e.g., heparin, warfarin, a direct thrombin inhibitor, or a direct factor Xa inhibitor), or use of anticoagulants is not known. Otherwise, treatment with intravenous tPA can be started before availability of coagulation test results but should be discontinued if the INR, PT, or aPTT exceed the limits stated in the table, or if platelet count is < 100 K/microliter.

²Consult Benign Hematology

³Patients may be treated with intravenous alteplase if glucose level is subsequently normalized

⁴Alteplase is reasonable in patients with a seizure at stroke onset if evidence suggests that residual impairments are secondary to acute ischemic stroke and not to a postictal phenomenon

⁵The safety and efficacy of administering alteplase is uncertain for these relative exclusions

⁶Although these were exclusions in the trial showing benefit in the 3-4.5 hour window, intravenous alteplase appears to be safe and may be beneficial for patients with these criteria, including patients taking oral anticoagulants with an INR < 1.7
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SUGGESTED READINGS


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DEVELOPMENT CREDITS

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