ADULT ACUTE STROKE

Suspected or known acute stroke

Prehospital Assessment and Care

- Monitor and support airway, breathing, circulation. Maintain SpO_2 of 94% or greater.
- Perform prehospital stroke screen and severity assessment and record time of symptom onset/last known normal
- Measure blood glucose; treat hypoglycemia as indicated
- Follow local protocols for destination decision
- Alert receiving hospital and follow protocols for stroke arrival

Activate stroke team per protocol

Immediate General Assessment

Best practice is to bring the patient directly to the imaging suite.

Within 10 minutes:

- Ensure airway
- Support oxygenation (maintain SpO_2 of 94% or greater)
- Monitor and support circulation as needed
- Order noncontrast CT or MRI
- Perform neurologic screening assessment
- Obtain vascular access and order laboratory studies
- Measure blood glucose and provide treatment as needed
- Obtain 12-lead ECG
- Place on NPO status

Within 20 minutes:

- Obtain focused history
- Conduct neurologic assessment (NIHSS or similar stroke severity tool)
- Determine time of symptom onset/last known normal
- Complete CT/MRI of head

Within 45 minutes:

- Interpret imaging results

Ischemic

Eligible for fibrinolytic and/or endovascular therapy?

YES

Start fibrinolytic therapy, endovascular therapy or both

- **Fibrinolytic therapy** (≤ 60 min of arrival)
  - ≤ 3 hours of symptom onset (< 4.5 hours for select patients)
- **Endovascular therapy** (if transfer needed, goal is < 60 min from arrival to departure)
  - ≤ 6 hours of symptom onset (6 to 24 hours for select patients)

Admit to stroke unit within 3 hours

- Begin post-therapy protocols
- Monitor for neurologic deterioration, complications of stroke/stroke therapy
- Manage blood pressure
- Manage glucose per protocol

NO

Consider adjuvant therapies

Seek neurology/expert consult

Admit to stroke unit within 3 hours

Hemorrhagic

- Consider reversal and/or treatment if patient is on anticoagulants
- Consider treatment of hypertensive crisis
- Manage raised intracranial pressure
- Treat seizures
- Seek expert consult (neurologist/neurosurgeon)

Prepare patient for admission to stroke unit within 3 hours or transfer to comprehensive stroke center within 2 hours.

Medication

Alteplase

- 0.9 mg/kg (maximum 90 mg) IV, infused over 60 min
- 10% of total dose as an initial IV bolus over 1 min
- Give remaining 90% of total dose IV over next 60 min

Note: May consider Tenecteplase as an alternative.

ADULT ACUTE STROKE

Signs and Symptoms of Stroke

- Acute-onset mental status changes or confusion
- Sudden weakness or numbness on one side of the body
- Sudden difficulty with language (e.g., difficulty speaking, difficulty understanding, garbled speech)
- Sudden loss of vision in one or both eyes
- Difficulty with walking, balance or coordination
- Sudden severe headache

Cincinnati Prehospital Stroke Scale (CPSS)

An abnormal finding in any one of the following three areas is associated with a 72% probability of stroke.

Facial Droop (ask patient to show teeth/smile)
- Normal: both sides of face move equally
- Abnormal: one side of the face does not move as well as the other side

Arm Drift (ask patient to close eyes and extend both arms straight out with the palms up for 10 seconds)
- Normal: both arms move the same, or both arms do not move at all
- Abnormal: one arm does not move, or one arm drifts downward as compared with the other

Abnormal Speech (ask patient to say "You can't teach an old dog new tricks")
- Normal: patient uses correct words without slurring
- Abnormal: patient uses incorrect words, slurs words or is unable to speak

Eligibility Criteria for Intravenous rtPA Administration in Patients with Acute Ischemic Stroke

Treatment Timing	Inclusion Criteria	Absolute Exclusion Criteria	Relative Exclusion Criteria
Within 3 hours of symptom onset or patient last known well or at baseline state	▪ Ischemic stroke diagnosis ▪ Measurable neurologic deficit ▪ ≥ 18 years of age	▪ Significant head trauma or stroke within last 3 months ▪ Symptoms suggestive of subarachnoid hemorrhage ▪ Arterial puncture at noncompressible site within last 7 days ▪ History of intracranial hemorrhage, intracranial tumor, AVM or aneurysm ▪ Recent intracranial or intraspinal surgery ▪ Hypertension (systolic blood pressure > 185 mmHg or diastolic blood pressure > 110 mmHg) ▪ Active internal bleeding ▪ Risk factors for acute bleeding, including but not limited to: • Low platelet count (< 100,000/mm³) • Heparin administration within the last 48 hours, resulting in an aPTT value greater than the upper limit of normal • Current use of an anticoagulant with an INR > 1.7 or a PT > 15 sec • Current use of direct thrombin inhibitors or direct factor Xa inhibitors with elevated results on sensitive laboratory tests (e.g., aPTT, INR, platelet count or ECT; TT or appropriate factor Xa activity assays) ▪ Low blood glucose level (< 50 mg/dL or 2.7 mmol/L) ▪ Multilobar infarction on CT	▪ Minor or rapidly improving stroke symptoms (clearing spontaneously) ▪ Pregnancy ▪ Seizure at onset ▪ Major surgery or serious trauma within past 14 days ▪ Gastrointestinal malignancy or recent gastrointestinal or urinary tract hemorrhage within past 21 days ▪ Recent acute myocardial infarction within past 3 months
Within 3 to 4.5 hours of symptom onset* or patient last known well or at baseline state	▪ Ischemic stroke diagnosis ▪ Measurable neurologic deficit	In addition to the exclusion criteria for treatment within 3 hours of symptom onset: ▪ Current anticoagulant therapy (INR > 1.7) ▪ History of ischemic stroke within previous 3 months	▪ Patients ≥ 80 years of age with a history of both diabetes mellitus and prior stroke

* Intravenous rtPA administration may also be considered for a patient with acute ischemic stroke who awakens with stroke symptoms or who has an unclear time of symptom onset greater than 4.5 hours from the last known well or baseline state who has a DW-MRI lesion smaller than one-third of the MCA territory and no visible signal change on FLAIR.

Blood Pressure Management

Patients who have elevated blood pressure and are otherwise eligible for treatment with intravenous rtPA (or mechanical thrombectomy) should have their blood pressure carefully lowered so that their systolic blood pressure (SBP) is less than 185 mmHg and their diastolic blood pressure (DBP) is less than 110 mmHg before intravenous fibrinolytic therapy is initiated.

Management of blood pressure for a patient otherwise eligible for emergency reperfusion therapy except that blood pressure is greater than 185/110 mmHg

Labetalol
- 10 to 20 mg IV over 1 to 2 min, may repeat 1 time OR

Nicardipine
- 5 mg/h IV, titrate up by 2.5 mg/h every 5 to 15 min (maximum 15 mg/h); when desired blood pressure reached, adjust to maintain proper blood pressure limits OR

Clevidipine
- 1 to 2 mg/h IV, titrate by doubling the dose every 2 to 5 min until desired blood pressure reached (maximum 21 mg/h)
- Other agents (e.g., hydralazine, enalaprilat) may also be considered.
- If blood pressure is not maintained at less than or equal to 185/110 mmHg, do not administer rtPA.

Management of blood pressure during and after rtPA or other emergency reperfusion therapy to maintain blood pressure at less than or equal to 180/105 mmHg

Monitor blood pressure every 15 min for 2 h from the start of rtPA therapy, then every 30 min for 6 h, and then every hour for 16 h.
If SBP > 180 to 230 mmHg or DBP > 105 to 120 mmHg:

Labetalol
- 10 mg IV followed by continuous IV infusion 2 to 8 mg/min OR

Nicardipine
- 5 mg/h IV; titrate up to desired effect by 2.5 mg/h every 5 to 15 min (maximum 15 mg/h) OR

Clevidipine
- 1 to 2 mg/h IV; titrate by doubling the dose every 2 to 5 min until desired blood pressure reached (maximum 21 mg/h)

If blood pressure is not controlled or DBP > 140 mmHg, consider IV sodium nitroprusside.

Treatment Recommendations

- CTA with CTP or MRA with diffusion-weighted MRI with or without MR perfusion may be used for selected patients.
- Common initial labs may include serum electrolyte panel with renal function tests, complete blood count, cardiac markers, prothrombin time, international normalized ratio, activated partial thromboplastin time.
- Discontinue therapy with anticoagulant or antiplatelet agents for 24 hours after rtPA administration.