

Acute Stroke Presenting to the STS

POSITIVE STROKE SCREEN

EXCLUSIONS: Sickle Cell Disease - See Separate SCD Stroke Algorithm
Sturge-Weber Syndrome - Consult Neuro & Pt. Care Plan

Stroke Screen

Positive if any of following are present:

1. Sudden onset of focal neurologic deficit?
 - Unilateral weakness, facial droop, and/or unilateral sensory changes
 - Dysarthria / abnormal speech / loss of vision
 - Vertigo plus focal deficit
2. Altered mental status plus risk factor?
3. Seizure with persistent focal deficit?

Risk Factors for Stroke

- Prior stroke
- Congenital heart disease (polycythemia or R → L shunt)
- Recent head or neck trauma (eg. MVA, whiplash, risk of dissection)
- AVM
- Hypercoagulable state
- History of brain radiation
- Sickle cell disease (**STOP:** Use separate SCD Stroke Algorithm)

EXAM

- ABCs (including BP + weight)
- **NIH Stroke Scale** (see back page, EPIC Smart Text, App)

HISTORY

- Time of Onset
- **Last known Normal Time**
- Risk Factors for stroke (see box)

RN

(ED STROKE ORDER SET)

MD

Place IV

- Proximal Upper Extremity
- Right preferred
- Unaffected side if possible
- Minimum 22g, Ideal 20g

Labs

- POC Glucose
- CBC
- PT, PTT, INR
- Renal Panel
- Type & Screen
- Pregnancy test (blood)
- Urine drug screen (for AMS)
- CXR (Portable to expedite)
- EKG (do not delay imaging)

Order STAT Non-Contrast Head CT

Onset ≤ 6 hours prior to arrival?

YES

1. Call **Stroke Team AND CCHMC Neuro** (Co-manage with ED)
2. Call CT (x66388): establish availability of Stroke CTA/MRI

Onset <4 hrs: Order IV r-tPA to bedside (order set)**

Hx of Migraines: Consider NS bolus + IV Compazine

NO

Pediatric (<21 yrs) or established CCHMC patient

Consult CCHMC Neuro (+/- Neurosurgery prn imaging results)
Appropriate Non-Emergent Imaging
Admit to CCHMC: PICU / Neuro / Subspecialty

Adult

Consult CCHMC Neuro (+/- Neurosurgery prn imaging results)
Consider Transfer to Adult Stroke Center (UCMC ED)

Non-Contrast Head CT ASAP

keep patient in CT until preliminary result

Normal or Ischemic Changes?

YES

Consider starting TPA (if recommended /no contraindications)**
If NOT a TPA candidate, administer PO Aspirin 81mg (40.5mg for <40kg)

Immediate Follow-Up Stroke imaging

(ED Stroke Order Set)

Patients ≥ 15 yrs

1. CTA Head (includes Aortic Arch through Circle of Willis)

Patients < 15 yrs

1. Acute Stroke MRI/MRA if immediately available and sedation not required
2. Otherwise, CTA Head

ED MD: Discuss with Neuro-radiologist then Stroke MD
Immediately upon study completion

Occlusion or Continued Concern for Ischemic Stroke?

YES

≤ 4.5 hours of onset?
Thrombolytic candidate?
(see reverse**)

Administer TPA if Indicated**
Alternative treatment prn (interventional)

If TPA will not be used, return dose to pharmacy with patient sticker for free replacement by manufacturer

> 4.5 hours of onset?
Not a thrombolytic candidate?
(see reverse**)

Q15 min vital signs
Stop TPA for acute deterioration**

**See reverse for TPA information, use, and dosing

NO

Intracranial Hemorrhage

Otherwise Abnormal (unlikely ischemic)

Pediatric (<21yrs) or established CCHMC patient

Consult CCHMC Neurosurgery
Consider Immediate CTA
Admit to CCHMC: PICU / Neurosurgery / Subspecialty

Adult

Consult CCHMC Neurosurgery
Consider Transfer to UCMC ED

Pediatric (<21 yrs) or established CCHMC patient

Consult CCHMC Neurosurgery prn results
Appropriate Non-Emergent Imaging
Admit to CCHMC: PICU / Neuro / Subspecialty

Pediatric (<15yrs), established CCHMC patient, or <21 and not a candidate for intervention

Admit to CCHMC: PICU / Neuro / Subspecialty

Adult (or ≥15 yrs if candidate for intervention)

Transfer to Adult Stroke Center **ASAP**
Stroke team helps facilitate (to UCMC ED or NSICU)

Pediatric (<15yrs), established CCHMC patient, or <21 and not a candidate for intervention

Admit to CCHMC: PICU
Consult Hematology
Maintain Normal:
• BP (do not drop more than 15% in 1st 24 hrs)
• Glucose (60-110)
• Temp

Stroke Team Pager: 513.844.7686
CCHMC CT: 513.636.6388
Radiologist (Stat Box): 513.636.6286
CCHMC Neurology: 513.736.7564

UCMC ED Attending: 513.584.AMEN (2636)
UCMC Transfer Center: 513.584.BEDS (2337)
UCMC NSICU: 513.584.7273 (Unit HUC)
UCMC Operator: 513.584.PAGE (7243)

NIH Stroke Scale Item			Function	Score
1a. Level of Consciousness				
Alert				0
Drowsy				1
Stuporous (requires repeated stimuli)				2
Coma (reflex responses only)				3
1b. LOC Questions (Month, Age)				
Both correct				0
One correct				1
Incorrect				2
1c. LOC Commands (Open, close eyes; make fist, let go)				
Obeys both correctly				0
Obeys one correctly				1
Incorrect				2
2. Best Gaze (Eyes open- patient follows examiners finger or face)				
Normal				0
Partial gaze palsy				1
Forced deviation				2
3. Visual (Introduce visual stimulus/ threat to patients visual field quadrants)				
No loss				0
Partial hemianopia				1
Complete hemianopia				2
Bilateral hemianopia				3
4. Facial Palsy (Show teeth, raise eyebrows and squeeze eyes shut)				
Normal				0
Minor asymmetry				1
Partial (lower face paralysis)				2
Complete				3
5a. Motor Arm-Left (Elevate extremity 90° and score drift/movement)				
No drift				0
Drift				1
Some effort against gravity				2
No effort against gravity				3
No movement				4
Amputation: joint fusion				9
5b. Motor Arm-Right (Elevate extremity 90° and score drift/movement)				
No drift				0
Drift				1
Some effort against gravity				2
No effort against gravity				3
No movement				4
Amputation: joint fusion				9
6a. Motor Leg-Left (Elevate extremity 30° and score drift/movement)				
No drift				0
Drift				1
Some effort against gravity				2
No effort against gravity				3
No movement				4
Amputation: joint fusion				9
6b. Motor Leg Right (Elevate extremity 30° and score drift/movement)				
No drift				0
Drift				1
Some effort against gravity				2
No effort against gravity				3
No movement				4
Amputation: joint fusion				9
7. Limb Ataxia (Finger-nose, heel down shin.)				
Absent				0
Present in upper or lower				1
Present in both				2
8. Sensory (Pin prick to face, arm, trunk and leg- compare side to side)				
Normal				0
Partial loss				1
Dense loss				2
9. Best Language (Name items, describe a picture and read sentences)				
No aphasia				0
Mild-moderate aphasia				1
Severe aphasia				2
Mute				3
10. Dysarthria (Evaluate speech clarity by patient repeating listed words)				
Normal articulation				0
Mild-moderate slurring				1
Severe near unintelligible or worse				2
11. Extinction and Inattention (Use information from prior testing to identify neglect or double simultaneous stimuli testing)				
No neglect				0
Partial neglect				1
Profound neglect				2

Total score:
 (Discuss NIHSS with Stroke Team to inform treatment and decision-making)
 0 = no stroke
 1-4 = minor stroke
 5-15 = moderate stroke
 15-20 = moderate/severe stroke
 21-42 = severe stroke

Recombinant Tissue Plasminogen Activator (r-tPA = Activase = Alteplase)

Eligibility:

- Stroke patients up to 4.5 hours from onset of symptoms
- Select stroke patients: intra-arterial (interventional) therapy up to 6-12+ hours from onset

Contraindications:

- Known bleeding diathesis (INR > 1.7, Plt <100K, heparin within 24 hours or ↑ aPTT)
- Blood Glucose <50 or >400
- SBP > 180 or DBP > 110 on repeated measurements despite non-aggressive treatment (for Adults: Labetolol 10-20mg IV over 1-2 min, may repeat x 1)
- ICH on CT
- Stroke, intracranial surgery, or serious head trauma in prior 3 months

Relative contraindications (stroke team input suggested):

- Minor (NIHSS < 6) or rapidly resolving stroke
- Severe stroke (NIHSS > 25)
- Obvious or large hypodensity seen on CT
- Post myocardial infarction pericarditis, other pericarditis
- Recent surgery at non-compressible site
- Recent GI bleed, pregnancy, severe diabetes

Dosing

- Total dose: 0.9 mg/kg IV – Use ED STROKE ORDER SET
 - Bolus (first 10% of dose over 1 minute)
 - Infusion (remaining 90% of dose over 60 minutes)

Complications

- Intracranial Hemorrhage
- If patient develops acute neurological deterioration (new headache, seizure, nausea and vomiting, acute hypertension):
 - STOP TPA infusion until ICH is ruled out
 - Repeat STAT Head CT to eval for bleed
 - Prepare to administer cryoprecipitate (containing Factor VIII) and platelets

Tests and Imaging

- Chest X-Ray: r/o widened mediastinum suggestive of dissection (contraindication to lytic therapy (TPA))
- EKG: r/o MI, pericarditis (contraindication for lytic therapy), eval for arrhythmia predisposing to thrombus
- Stat Head CT (Non-Contrast)
 - Eval for intracranial hemorrhage
 - As etiology for stroke symptoms
 - As contraindication for lytic therapy
 - Eval for other causes of symptoms (mass, CSF obstruction, etc)

This algorithm has been developed by the Medical Resuscitation Committee of the CCHMC ED with Radiology, Neurology, Neurosurgery, Hematology, ICU, and Stroke Team input. Last revised: September 2017. The contents of this publication, including text, graphics and other materials ("Contents") is a recitation of general scientific principles. Intended for broad and general physician understanding and knowledge and is offered solely for educational and informational purposes as an academic service of Cincinnati Children's Hospital Medical Center (CCHMC). The information should in no way be considered as an establishment of any type of standard of care, nor is it offering medical advice for a particular patient or as constituting medical consultation services, either formal or informal. While the Content may be consulted for guidance, it is not intended for use as a substitute for independent professional medical judgment, advice, diagnosis, or treatment.