Brain Attack Pathway (BAT): Inpatient (march 2021)
(Not to be a substitution for proper clinical judgement)

NORTON Children's

tPA contraindications

Disclaimer

Screening Questions (Needs 1):
- Unilateral Weakness
- Unilateral Numbness
- Facial Droop (sparing forehead)
- Aphasia or Dysarthria
- Unilateral incoordination
- Visual loss or Double Vision

Alert Criteria (Needs ALL 3)
1. Symptom Onset < 12 hours
2. No prior hx of Todd's paralysis
3. Problem began or worsened suddenly

Further History:
- Time of last known normal
- NPO status
- Hx of headache, seizure, URI, sickle cell, cardiac disease, neck trauma, clotting disorder
- Family hx of young stroke
- Home meds (including OCPs)

If 1 screening question AND all 3 alert criteria met → NIHSS + Page Neurology to discuss activating BAT

Step 1a

Initial management
1. ABCs, CR monitor, make NPO, place 2 large bore IVs
2. Glucose stick, CBC, PT/PTT/INR, type & screen, CRP/ESR, urine drug screen, pregnancy test (female > 9 yo), EKG
3. HOB flat, strict bed rest

Neuroprotective measures
1. Normovolemia: Isotonic fluid (0.9% NS) at maintenance w/ prn bolus
2. Normotension: SBP between 50-90th % for age, treat low BPs w/ NS ± pressors; tx htn with labetalol to lower by 25% over 24 hours
3. Normothermia: Treat T >38 C with rectal acetaminophen
4. Normoglycemia: No glucose in IVF unless hypoglycemic
5. Normal O2 and CO2: > 92% O2
6. Seizure control: AEDs ASAP with any seizure activity

Step 1b

NIHSS by certified provider (*ED & PICU fellows & attendings*)
STAT CT Head without contrast

Bleed/Tumor?

1. Reverse Coagulopathy
2. Call Neurosurgery

Step 2

Neuro – Reassess need to continue pathway with primary
ED/PICU – Call radiology tech, pharmacy (x7273: ASK FOR ICU RPH) and anesthesia if needed (place note in chart to document emergent status)

If at OUTSIDE HOSPITAL:
1. NORTON Facility: Stat STROKE PROTOCOL head CT
2. If outside Norton stat non-contrast CT of head; send copy of imaging with patient
3. Arrange for transport to NCH:
   1. Just For Kids transport: 888-729-9111
4. Notify NCH ED of ETA (629-4019)

Step 3

Fast brain MRI "Stroke Protocol"
DWI, SWI, Axial FLAIR, Axial T2, Sag T1; MRA head & neck; MR perfusion

If sedated, consider additional imaging options that may help

"Fat Sat" if hx of neck trauma/pain
MRV if presenting w/headache, chemotherapy, pregnancy, papilledema
Contrast, if concern for tumor, demyelination, or infection
Case dependent – consider CTA/CTP "CT stroke protocol"

Step 4

No ischemic stroke
PICU vs floor
Neurologic workup

Ischemic stroke w/open vessels
- Acute stroke management in the PICU
- Neuroprotective measures
- Aspirin-If >15kg, ASA 81 mg once. If <15kg, ASA 5 mg/kg
- Etiology: Hypercoaglable w/up w/hematology, TTE w/bubble study

Ischemic stroke 2/concern for dissection or multiple emboli
- Acute stroke management in the PICU
- Neuroprotective measures
- ±Heparim w/heme/cardio consult
- Etiology: Hypercoagulable w/up, TTE w/bubble study vs TEE

Ischemic stroke w/large vessel occlusio (M1, ICA, Basilar)
- Neuroprotective measures
- Review tPA checklist
- Discuss w/neurovascular
- ±Heparim w/heme/cardio consult
- Etiology work up

Step 5

IV tPA Criteria: Onset < 4.5 hours, NIHSS > 6 and < 24, no exclusions to IV tPA, MRI appropriate, signed tPA consent
- If yes, go to page 2

Clot Retrieval Criteria: Onset < 12 hours for anterior, or <24 hours for posterior, must be deemed appropriate by neuro intervention

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Algorithm | Disclaimer

Contraindications to tPA

History
1. > 4.5 hours from last know normal
2. Time of symptoms start unknown
3. Stroke, major head trauma, or intracranial surgery in last 3 months
4. History of ICH, aneurysm, or AVM
5. Major surgery in last 10 days
6. GI or GU bleeding in last 21 days
7. Hx of neoplasm or malignancy
8. Underlying significant bleeding disorder
9. Heparin or aspirin given
10. Dx of PACNS or secondary angitis
11. Seizure at onset (relative contraindication)

Patient factors
1. Would decline blood transfusion if needed Presentation consistent with acute MI or pericarditis
2. Arterial puncture at non compressible site or LP within past 7 days

Etiology:
Stroke due to SBE, sickle cell disease, moyamoya disease, meningitis, embolism (other than thrombotic), MELAS

Exam:
1. Persistent SBP > 15% above 95th % for age Peds NIHSS < 6 at the time beginning infusion Resolving deficit without intervention

Imaging:
1. ICH on CT or MRI or symptoms suggesting SAH (even CT negative) Hypodensity on CTH
2. > 1/3 MCA territory involvement on CT or MRI Intracranial cerviocephalic dissection

Labs:
1. D-stick < 50 mg/dl or > 400 mg/dl
2. Bleeding diathesis, platelets<100,000, PT > 15 or elevated INR

Confirmed IV tPA candidate
- ED Pharmacy prepares tPA infusion with stat release to ED or ICU
- **Total dose** – 0.9 mg/kg IV
- **Bolus dose** – 10% of total dose IV over 5 mins
- **Infusion dose** - remaining 90% IV over 1 hour
- **Nurse/MD double checks dose with pharmacy**

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Maintain cardiorespiratory and BP monitoring
If age based parameters acceptable, give tPA when available
Systolic BPs should be maintained between 50th % for age and 15% above 95% for age

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During TPA perform vitals and neurochecks q15 min

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Post tPA perform vital signs and neurochecks
- **Q15 min for 2 h**
- **Q30 min for 6 h**
- **Q2 h for 24 h**

If neuro changes
1. Stat non-contrast head CT
2. If positive for hemorrhage:
3. Prepare to give cryoprecipitate (containing factor VIII) (1-2 U/10 kgs body weight; 5 mls/kg is less than 30 kgs)
4. Consider Tranexamic acid (TXA) 15mg/kg IV if cryoprecipitate is delayed (See alteplase reversal included in anticoagulant reversal order set)

Treat to lower BP if > 15% above 95% for age for > 1 hour or > 20% at any time
- Labetalol 0.2 mg/kg IV push over 2-3 min, repeat q15 mins prn
- Consider nicardipine drip, 1 mcg/kg/min, titrate to desired BP

- No foley for 4 hours
- No NGT for 24 hours
- No anticoagulants or antithrombotics for 24 hours Repeat CTH for 24 hours

Systolic BP Parameters - Male

Age	50%	95%	> 15% above 95%	> 20% above 95%
1-4 years	90	112	129	134
5 years	95	113	130	136
6-10 years	96	121	139	145
11-18 years	105	140	161	168
>18 years	110	140	161	168

Systolic BP Parameters - Female

Age	50%	95%	>15% above 95%	> 20% above 95%
1-4 years	90	111	128	133
5 years	94	113	130	136
6-10 years	96	121	139	145
11-18 years	105	131	151	157
>18 years	110	140	161	168

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The policies set forth in this policy library do not establish a standard to be followed in every case. It is impossible to anticipate all possible solutions that may exist and to prepare policies for each. These policies should be considered guidelines with the understanding that departures from them may be required at times. Accordingly, it is recognized that those individuals employed in providing healthcare are expected to use their own judgment in determining what is in the best interests of the patient based on the circumstances existing at the time. If a policy contains references to clinical literature or other resources, such as Lippincott, Ovid, and/or Elsevier, these resources are only intended to support the reasoning for adoption of certain guidelines contained herein. It is not an endorsement of any article or text as authoritative. Norton Healthcare specifically recognizes there may be articles or texts containing other opinions on point that may be helpful and valid which would support other care or actions, given a particular set or circumstances. No literature is ever intended to replace the education, training and experience or exercise of judgment of the healthcare providers.

Last update: 12/2024

Contact: adam.isacoff@nortonhealthcare.org