

Aim: To standardize evaluation and management of suspected stroke.

**Suspicion for stroke (note 1) in inpatient, any of the following:**

- Acute onset hemiparesis
- Aphasia
- Visual field loss
- Ataxia
- Dysarthria
- Hemisensory loss
- New-onset focal seizures with > 2 hr post-ictal paralysis

**Evaluate emergently:** *Call rapid-response or Dr. Blue if significant respiratory or hemodynamic instability*

- Consult Pediatric Neurology ("Noran" under Neurology on Amion, say STROKE)
- NPO, Place PIV, bed rest, keep O2 sats > 95%
- HOB up 30-45 (in case CVST or intracranial hemorrhage)
- Obtain STAT CBC with diff, PT/PTT/Fib, CMP, POC glucose, EKG- *do not delay imaging*
- Acetaminophen Q6 hours for temp> 37 C, NO NSAIDS
- *Plan for PICU transfer- do not delay imaging*

**Obtain non-contrast head CT immediately, with plan to go directly to MRI afterwards (do not delay CT)**

- If < 3 hours since LKW (last known well), order STAT quick brain MRI
- If LKW between 3-24 hours of LKW, order urgent MRI/MRA
  - Add MRV if cerebral venous sinus thrombosis is suspected

**Off guideline**  
*Evaluate for other causes*

**MRI positive for stroke (note 1)?**

**TRANSFER to PICU**  
*(do not delay other consults)*  
**Is there a large vessel occlusion\*\* (LVO)?**

**Stat consult to Neuro-interventional Radiologist**

1. **Abbott Northwestern:** [www.anwpaging.com](http://www.anwpaging.com) → "Check who's On-Call" → Interventional Radiology → Neuro IR
2. **United** stroke pager: (612) 740-2222 (also in United Amion under "Radiology" (NIR 1<sup>st</sup> call and 2<sup>nd</sup> call))

*Patients who need neuro-interventional radiology at Abbott or United will return to Children's after their intervention.*

**EXCLUSION GUIDELINES**

- Patients with sickle cell disease
- Patients with known metabolic disorders
- Patients < 2 years age
- \*\*Cerebral venous sinus thrombosis (CVST): See separate guideline
- Moyamoya syndrome

**Ongoing management per PICU**

- Consult neurosurgery
- Hematology and Neurology consults
- Keep glucose 50-150

**Give Aspirin 3-5 mg/kg x 1**  
(max dose = 325 mg)

**Does imaging show a bleed?**

**Meets tPA criteria?**  
(note 2)

**Ongoing management per PICU**

- Consults: Neurology, Hematology
- Neurosurgery, Neuro-interventional radiologist if applicable
- Consult PT, OT, Speech

**Follow tPA protocol** (note 3) + initiate orders  
**Ongoing management per PICU**

Aim: To standardize evaluation and management of suspected stroke.

**Note 1. Stroke types**

- **Hemorrhagic**
- **AIS** (arterial ischemic stroke)
- **CVST** (cerebral venous sinus thrombosis)

**Contact info: Minneapolis**

1. Pediatric Neuro On-Call: Amion: Noran
2. Heme: Amion
3. PICU Attending: x58563 or Amion
4. Neuroradiology: x58200 or Amion
5. Sedation Coordinator: 612-813-8285
6. CVCC Attending: x58411 or Amion
7. Abbott Northwestern: [www.anwpaging.com](http://www.anwpaging.com)  
→ "Check who's On-Call" → Interventional Radiology → Neuro IR

**Contact info: St. Paul**

1. Pediatric Neuro On-Call: Amion:  
Noran/Children's
2. Heme: Amion
3. PICU Attending: x68563 or Amion
4. Neuroradiology: Amion
5. MRI Coordinator: 651-220-6147
6. Neuro Interventional Radiology: stroke pager  
612-740-2222 (also in United Amion under  
"Radiology") (NIR 1<sup>st</sup> call and 2<sup>nd</sup> call)

**Note 2: tPA (Adapted from CHOP and TIPS trial study criteria)****Inclusion Criteria: Age 6-18 years**

- Clinical diagnosis of ischemic stroke with onset within 4.5 hours of treatment initiation
- Confirmed restricted diffusion on MRI
- Symptoms indicate evolving major disabling stroke

**Exclusion Criteria:**

- Stroke due to: endocarditis, sickle cell, bilateral Moyamoya
- Stroke or head trauma within past 3 months
- Any prior intracranial hemorrhage which might increase risk recurrent hemorrhage
- Major surgery within 14 days
- GI or GU bleeding within previous 21 days
- Arterial puncture at non-compressible site within 7 days
- Lumbar puncture within 7 days
- Rapidly improving stroke symptoms
- CT or SWI MRI with evidence of hemorrhage
- Presentation consistent with acute myocardial infarction (MI) or post-MI pericarditis (requires cardiology evaluation)
- Persistent SBP or DBP ≥ 10 mmHg above the 95<sup>th</sup> percentile for norms
- Platelets < 100,000
- Glucose < 50 or > 400
- INR > 1.7 if on warfarin
- On heparin therapy within 48 hours and with elevated PTT
- Pregnant or lactating female
- CT with evidence of hypodensity and/or effacement of cerebral or cerebellar sulci in > 33% of MCA territory (relative contraindication)

**Note 3: tPA administration:**

- Total dose 0.9 mg/kg (Max dose 90 mg)
- Administer 10% of the dose as an IV bolus over 5 minutes. Infuse remainder over 1 hour via dedicated IV line
- Hold other anticoagulation x at least 24 hours
- Monitor in ICU at least 48 hours
- Avoid invasive procedures (e.g. blood draws, catheters, lines, NG placement) x at least 24 hours

Aim: To standardize evaluation and management of suspected stroke.

## References:

- Sporns PB, Kemmling A, Lee S, Fullerton H, Kunz WG, Wilson JL, Mackay MT, Steinlin M, Fiehler J, Psychogios M, Wildgruber M. A Prospective Multicenter Registry on Feasibility, Safety, and Outcome of Endovascular Recanalization in Childhood Stroke (Save ChildS Pro). *Front Neurol*. 2021 Sep 3;12:736092.
- Bhatia K, Kortman H, Blair C, Parker G, Brunacci D, Ang T, Worthington J, Muthusami P, Shoirah H, Mocco J, Krings T. Mechanical thrombectomy in pediatric stroke: systematic review, individual patient data meta-analysis, and case series. *J Neurosurg Pediatr*. 2019 Aug 9;1-14. doi: 10.3171/2019.5.PEDS19126. PMID: 31398697.
- Bhatia KD, Briest R, Goetti R, Webster R, Troedson C, Dale RC, Muthusami P, Miteff C, Miteff F, Worthington J, Tastula K, Ang T, Andrews I. Incidence and Natural History of Pediatric Large Vessel Occlusion Stroke: A Population Study. *JAMA Neurol*. 2022 May 1;79(5):488-497. doi: 10.1001/jamaneurol.2022.0323. PMID: 35344005; PMCID: PMC8961400.
- Surtees TL, Pearson R, Harrar DB, Lee S, Amlie-Lefond CM, Williams KP. Acute Hospital Management of Pediatric Stroke. *Semin Pediatr Neurol*. 2022 Oct;43:100990. doi: 10.1016/j.spen.2022.100990. Epub 2022 Aug 19. PMID:36344020.
- Ferriero DM, Fullerton HJ, Bernard TJ, Billingham L, Daniels SR, DeBaun MR, deVeber G, Ichord RN, Jordan LC, Massicotte P, Meldau J, Roach ES, Smith ER; American Heart Association Stroke Council and Council on Cardiovascular and Stroke Nursing. Management of Stroke in Neonates and Children: A Scientific Statement From the American Heart Association/American Stroke Association. *Stroke*. 2019 Mar;50(3):e51-e96. doi: 10.1161/STR.000000000000183. PMID: 30686119.

**Workgroup:** Garland, Wexler, Torok, Lissick, Lawson, Patel, Asaithambi (ANW)