# New Clinical Guidelines: Pediatric Acute Ischemic Stroke (AIS) Treatment

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## Pediatric Stroke

- Incidence 2-13/100,000, M>F
- 55 % ischemic vs hemorrhage
- Up to 50% are cryptogenic with low recurrence rate
- Symptomatic causes
  - Vasculopathy
  - Cardiac
  - Connective tissue disorders
  - Metabolic
  - Hypercoagulable state

## Diagnostic Barriers

- Average time to diagnosis 12-24 hours
- Wide differential for focal deficits
- Poor sensitivity of CT scan
- Lack of experience with pediatric AIS
- Stroke mimics
  - Migraine
  - Seizure or post-ictal state
  - Bell's palsy
  - Encephalitis
  - Demyelinating

## Stroke Outcomes

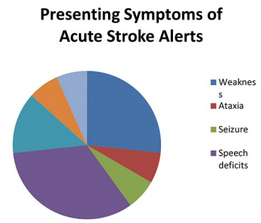
- Severity of cerebral damage and resultant neurological impairments are multifactorial but in part are a factor of the duration of ischemia and timing of perfusion
- Burden of stroke amplified by duration of deficits (decades)

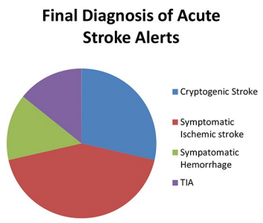
## tPA (alteplase) in Children

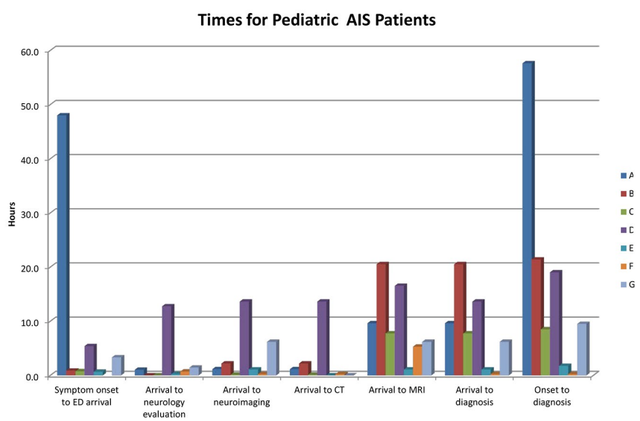
- Not FDA approved < 18 yo
- Yet it has been done increasingly since 2000
- Effectiveness, safety and dose not established yet

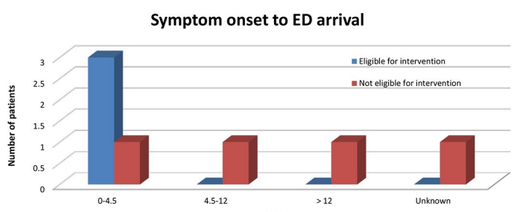
## Pediatric AIS at SMH 2013-2016

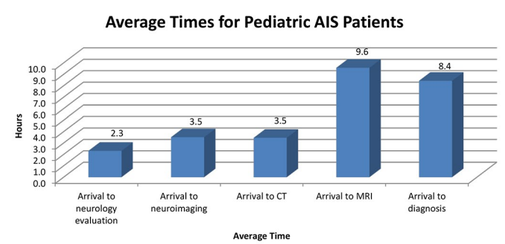
| Patient | Date | Age | Sex | Chief complaint | Receive acute intervention? | Eligible for acute intervention? | Reason for no acute intervention? | NIHSS | Final diagnosis | ASA? | Other Treatment? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 10/19/13 | 8 | M | left hemiparesis/ataxia | no | no | > 12 hours | - | R pontine infarct 2/2 presumed protein C deficiency | yes | no |
| B | 9/27/14 | 12 | M | seizure, aphasia, encephalopathy onset during track meet | no | yes | prolonged encephalopathy concerning for NCSE | - | Cryptogenic L MCA infarct | yes | no |
| C | 11/27/14 | 13 | F | left hemiparesis, facial droop | no | yes | missed occlusion initially, non surgical candidate as clot propigated distally | 9 | R MCA infarct 2/2 to presumed hypercoagulable state | yes | enoxaparin for presumed hypercoagulable state and acute arterial thrombosis s/p embolectomy |
| D | 7/30/15 | 17 | M | expressive aphasia | no | no | > 12 hours, hemorrhage | 4 | L thalamic hemorrhage likely 2/2 hypertension | no | no |
| E | 1/20/16 | 13 | M | headache, dysarthria, L facial droop | no | no | Symptoms resolved, no MRI confirmation, HbSS | 1 | TIA | no | chronic transfusion |
| F | 3/19/16 | 16 | M | acute transient bilateral visual loss, slurred speech and confusion following trauma to the left neck with a lacrosse ball | no | yes | symptoms resolved | 0 | LICA dissection 2/2 trauma | initially | heparin gtt in hospital transitioned to warfarin |
| G | 4/27/16 | 17 | M | right hemianesthesia, hemiparesis and facial droop with slurred speech | no | yes | symptoms resolving | - | Cryptogenic L PLIC infarct | yes | no |



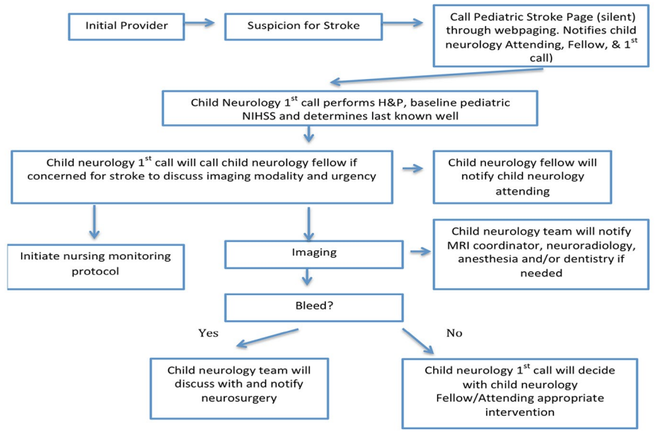




## Clinical Guidelines




## Eligibility for tPA (alteplase)

- 6 up to 18 yo (not including)
- Last known normal within **4.5 hours**
- AIS confirmation on MRI
- Symptoms indicative of evolving major disabling stroke
- No exclusion criteria (similar to adult protocol)
  - Sickle cell & moyamoya excluded

## Treatment Guideline References


- Informational Packet for Pediatric Stroke Program Start-up and Operation Children's Hospital of Philadelphia (October 2009)
- AHA Scientific Statement: Management of Stroke in Infants and Children: A Scientific Statement From a Special Writing Group of the American Heart Association Stroke Council and the Council on Cerebrovascular Disease in the Young. 2008. Stroke. 39 (9):2644-2691.
- Monagle P, Chan A, Massicotte P, Chalmers E and Michelson AD. Antithrombotic therapy in neonates and children: American College of Chest Physicians Evidence-based Clinical Practice Guidelines (8th edition). *Chest* 133: 887-968, 2008
- Pediatric Stroke Working Group. Stroke in childhood: Clinical guidelines for diagnosis, management and rehabilitation. Royal College of Physicians of London, 2004.