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

Jaclyn Martindale, DO

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)

Pediatric AIS at SMH 2013-2016

<table>
<thead>
<tr>
<th>Patient</th>
<th>Dose</th>
<th>Age</th>
<th>Sex</th>
<th>Chief complaint</th>
<th>Neurological examination</th>
<th>Signs of focal ischemia</th>
<th>Vascular anatomy</th>
<th>Other investigations</th>
<th>Treatment 72 hours</th>
<th>Other Treatment 72 hours</th>
<th>AIS diagnosis</th>
<th>Other diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5/05/13</td>
<td>5</td>
<td>M</td>
<td>Left hemiparesis</td>
<td>No</td>
<td>No</td>
<td>1 hour</td>
<td>Vascular anatomy</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>B</td>
<td>5/07/13</td>
<td>10</td>
<td>M</td>
<td>Swallowing difficulty, left arm</td>
<td>No</td>
<td>Yes</td>
<td>1 hour</td>
<td>Vascular anatomy</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>C</td>
<td>5/10/13</td>
<td>15</td>
<td>F</td>
<td>Left hemiparesis, facial droop</td>
<td>No</td>
<td>Yes</td>
<td>1 hour</td>
<td>Vascular anatomy</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>D</td>
<td>5/13/13</td>
<td>20</td>
<td>F</td>
<td>Episodic episodes of left arm</td>
<td>No</td>
<td>No</td>
<td>1 hour</td>
<td>Vascular anatomy</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>E</td>
<td>5/15/13</td>
<td>25</td>
<td>M</td>
<td>Sudden onset of left arm</td>
<td>No</td>
<td>No</td>
<td>1 hour</td>
<td>Vascular anatomy</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>F</td>
<td>5/17/13</td>
<td>30</td>
<td>M</td>
<td>Acute onset bilateral weakness, severe speech, and confusional state</td>
<td>No</td>
<td>Yes</td>
<td>1 hour</td>
<td>Vascular anatomy</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>G</td>
<td>5/19/13</td>
<td>35</td>
<td>M</td>
<td>Right hemiparesis, expressive aphasia</td>
<td>No</td>
<td>No</td>
<td>1 hour</td>
<td>Vascular anatomy</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Presenting Symptoms of Acute Stroke Alerts

Final Diagnosis of Acute Stroke Alerts

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

Clinical Guidelines
- Initial Provider
- Prehospital Provider
- Emergency Department Provider
- Call Pediatric Stroke Page (Surviving the最初 section)
- Neurology 1st call performs Head, baseline pediatric neuroimaging, and determines head CT window

Final Diagnosis of Acute Stroke Alerts

Treatment Guideline References
- Informational Packet for Pediatric Stroke Program Start-up and Operation Children’s Hospital of Philadelphia (October 2009)

Treatement Guideline References
- Informational Packet for Pediatric Stroke Program Start-up and Operation Children’s Hospital of Philadelphia (October 2009)

tPA (alteplase) in Children
- Not FDA approved < 18 yo
- Yet it has been done increasingly since 2000
- Effectiveness, safety and dose not established yet