Reducing Variability in Pediatric Neurologists’ Approach to Pediatric Acute Ischemic Stroke

Jenny Wilson, MD, Ittai Bushlin, MD, PhD, Jason Coryell, MD
Division of Pediatric Neurology
Oregon Health & Science University
9/21/18

Disclosures
• No relevant financial disclosures
• I will be discussed off-label use of acute therapies (IV tPA, endovascular therapy) in pediatric stroke

Background: pediatric stroke
• Pediatric arterial ischemic stroke 1-13/100,000 per year
• Acute therapies:
  • AHA guidelines
  • IV tPA should only be given to children in the setting of a clinical trial; no consensus on use in adolescents
  • Endovascular therapy (ET) be reasonable for some patients <18 years
• Though children tend to have delayed diagnosis, treatment at a pediatric stroke center with stroke protocols in place may result in better outcomes
• Challenges in providing consistent care at small or medium sized children's hospital without a 24-7 pediatric stroke physician
Slide 4

**Background: OHSU**

- ~ 30 pediatric strokes (all types) per year
- 7 pediatric neurologists cover call. All respond to pediatric stroke.
- 0 children have received IV tPA in recent years
- 4 pediatric endovascular cases in the past ~4 years

---

Slide 5

17 Children with AIS admitted to DCH 2013-2015

- Age in years
- In hospital (41%)
- DCH ER (12%)
- OSH ER (41%)

---

Slide 6

**Criteria for acute treatment**

- Age < 17 years
- < 5 feet
- S. 214 ft²
- T. 385 ft²
- No core contributions
- IV/IVC or carotid-middle cerebral artery occlusion
- May be IV TPA administration
- May be endovascular thrombectomy
- May be endovascular therapy
Project conception

• **Problem:** There is an inconsistent approach to the in-hospital management of acute ischemic stroke among pediatric neurologists.

• **Purpose:** Develop and execute a quality improvement project involving team-based learning to improve the consistency of pediatric neurologists’ responses to acute pediatric stroke at OHSU.

Methods

• Quality Improvement Project in Division of Pediatric Neurology carried out in Spring, 2018, with pediatric neurology attendings participating

• Improving knowledge of stroke protocol through team-based learning exercise
  - Activating pager
  - Neuroprotection
  - Imaging
  - Qualifying for intervention

• Reducing intra-attending variability in approach to possible strokes.
Methods

- Tests consisting of questions based on clinical scenarios developed, based on stroke protocol and workflow guidelines.

Scenario 1:

8 year old girl is brought to DCH ER. The ER resident calls the child neurology resident reporting that the child was last in her normal state 3 hours ago (it is currently 9 pm). The child neurology resident immediately calls to discuss management with you. The patient is afebrile and mildly tachycardic (112 bpm). She now has left face/arm/leg weakness. She is described as having slurred speech but is awake. No trauma has been reported; this likely happened when the child was in her room unsupervised. When the parent called to her to come join the family for dinner, she did not come, and mother found her in her room unable to walk and seeming confused.

1. Upon learning about the case from the on-call resident, what is the first course of action? After choosing a single best answer, order all four choices in terms of how you would prioritize.
   - Recommend imaging to the ER
   - Call the on-call stroke attending to discuss case
   - Activate the stroke pager
   - Assess the PedNIHSS

2. Where do you access the stroke protocol?
   - X:/>>>pedsneuro/clinic shared information/Clinical protocols/acute stroke protocol_May2016
   - EPIC>Patient Care>Protocols
   - EPIC>MySmartPhrases>pedstrokeprotocol
   - EPIC>References>Departmental References>Pediatric Critical Care>Acute Stroke Protocol

3. What imaging should you recommend?
   - CT swift prime
   - QB MRI w/ DWI
   - MRI rapid swift
   - MRI brain/MRA head and neck

Methods

Individual Readiness Assurance Test (iRAT)

Group readiness assurance test (gRAT): Same test taken in groups of 3-4 as a part of a team-based learning exercise

Attendance complete 4 clinical cases

Results

- Mean iRAT score 78%
- Mean gRAT score 88%
- Case 4 is the same as scenario 2 done in the RAT. The knowledge increased (0.875% correct vs 0.78% correct) when re-assessed 3 months later.
- Physicians were 18% more likely to strongly or moderately agree with knowing the criteria for acute intervention.
- All providers indicated that they had better comfort with a consistent approach to stroke.
- Changes to the stroke protocol were made as a result of feedback from the exercises.
Slide 13

Scores on RATs and clinical questions

Slide 14

Percentage correct by theme

Slide 15

Discussion

- Team Based Learning was a well-received training mechanism
- The project helped clarify and improve our stroke protocol and response
- All providers reported more comfort with responding to stroke
- Challenges remain – there are no data driven or consensus based guidelines for giving acute therapies in pediatric stroke.
- We will continue to regularly review of pediatric stroke cases for QI purposes
- Simulations/mock stroke codes
- Increasing consistency of stroke response across the state
Thanks

• Division of pediatric neurology
• Windy Stevenson, MD
• Adult stroke at OHSU