SIMULATION CODE
STROKE

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• No financial disclosures
• Off label use-tpa within 4.5 hours of symptom onset
You receive this patient in the ED

- A 61 year old woman who was brought from the shopping mall when she had acute onset slurred speech and left arm weakness
What do neurology residents think about stroke codes?

“This is a high stress situation”

“It’s like they just dump you in the situation”

“It’s scary to be alone at night.”
Why Use Simulation for Acute Stroke

• High acuity patient
• Large number of team members
• Complex decision making
  • Time sensitive treatments available
  • Rapid decision making required
  • Multiple factors in patient history, exam, radiologic studies needed
Why Use Simulation for Acute Stroke

Novice neurology residents
+
High acuity patient, multiple team members, complex decision making
=
High risk for delays in treatment, decision errors
So what?

High risk for delays in treatment, decision errors this can lead to

- Poor patient outcomes
- Decreased satisfaction of experience for patients and providers
- Increased cost burden to society with more disabled patients
All the pieces of the puzzle.
CRISIS RESOURCE MANAGEMENT

Call for Help Early
Anticipate and Plan
Know the Environment
Use All Available Information
Allocate Attention Wisely
Mobilize Resources
Use Cognitive Aids
Communicate Effectively
Distribute the Workload
Establish Role Clarity
Designate Leadership

CRM KEY POINTS

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<table>
<thead>
<tr>
<th>Acute Stroke Code Flowchart</th>
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<tbody>
<tr>
<td><strong>RN 1</strong></td>
</tr>
<tr>
<td>Stat labs, iv starts</td>
</tr>
<tr>
<td>Accurate weight</td>
</tr>
<tr>
<td>Monitor vitals</td>
</tr>
<tr>
<td>In CT, give prn</td>
</tr>
<tr>
<td>meds</td>
</tr>
<tr>
<td>If tpa ordered,</td>
</tr>
<tr>
<td>prepare tpa</td>
</tr>
<tr>
<td>pump, iv tubes</td>
</tr>
<tr>
<td>Prepare pump,</td>
</tr>
<tr>
<td>Start bolus</td>
</tr>
<tr>
<td><strong>RN 2</strong></td>
</tr>
<tr>
<td>hook to transport monitor</td>
</tr>
<tr>
<td>NIHSS with neuroMD</td>
</tr>
<tr>
<td><strong>Team Member</strong></td>
</tr>
<tr>
<td>ED MD: orders,</td>
</tr>
<tr>
<td>screening</td>
</tr>
<tr>
<td>CT: Clear table</td>
</tr>
<tr>
<td>Rads: reads</td>
</tr>
<tr>
<td>protocols scan, call</td>
</tr>
<tr>
<td>MDs</td>
</tr>
<tr>
<td>PharmD: stand by for orders,</td>
</tr>
<tr>
<td>mix and deliver</td>
</tr>
<tr>
<td><strong>Neuro Fellow/Attgd</strong></td>
</tr>
<tr>
<td>Arrive at CT to review scan</td>
</tr>
<tr>
<td>If coming from home,</td>
</tr>
<tr>
<td>Can make tpa decision on</td>
</tr>
<tr>
<td>phone</td>
</tr>
<tr>
<td>If BP ok, hx/criteria</td>
</tr>
<tr>
<td>ok, verbally verify tpa</td>
</tr>
<tr>
<td>order to start bolus</td>
</tr>
<tr>
<td><strong>Neuro Res</strong></td>
</tr>
<tr>
<td>Hx, exclusion</td>
</tr>
<tr>
<td>NIHSS, go to CT</td>
</tr>
<tr>
<td>Call fellow, family</td>
</tr>
<tr>
<td>Review CT</td>
</tr>
<tr>
<td>No bleed- tell RN/ED MD to</td>
</tr>
<tr>
<td>order tpa</td>
</tr>
<tr>
<td>If BP ok, hx/criteria</td>
</tr>
<tr>
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Goal: CT <25 min
Goal: Order for tpa placed <40 min
Goal: tpa bolus <60 min
Simulation for Neurology Residents

- Learning objectives
  - abbreviated history
  - use NIHSS as tool for physical exam
  - Interpretation of non-contrast head CT
  - calculate tpa dose
  - write tpa order set
  - courteous yet efficient manner with patient
  - Coordination with other care providers
Methods

1. Stroke neurologist trained actor to play a standardized patient.
2. A stroke nurse interacted with trainees and carried out nursing duties.
3. 6 residents attended a 4 hour training session with 2 scenarios.
4. Trainees communicated with the stroke attending and RN during scenario.
5. Debriefing occurred after each scenario.
6. Trainees completed evaluations after the simulation.
Types of Scenarios

- ischemic stroke requiring i.v. tPA
- warfarin-associated intracranial hemorrhage
EPIC TPA ORDER SET
Evaluation of Experience by Trainees

- Overall evaluation: 
- Facilities: 
- Overall organization: 
- Learning from scenario: 
- Quality of teaching: 

0 1 2 3 4 5
Post Stroke Simulation Knowledge

• Average score of 9/10 in post stroke knowledge assessment
• Included array of multiple choice questions covering clinical content
• And crisis resource management
Feedback by Trainees

• “Having a real life actor was really helpful to learn how to act quickly during an emergency.”

• “Realistic situation without risk- this is great for learning.”
Expansion

• Work with ED RNs in multi-disciplinary teams in simulation

• Expansion to other acute neurologic emergencies (herniation syndrome)

• Simulations for use in process flow improvements
Multi-disciplinary teams in stroke simulation

• Work with new ED RN trainees to help train RN roles

• Had neurologist participate to reinforce CRM training
Acute herniation syndrome

• Used mannequin as patient
• Operationalized technical skills including intubation, interpreting scans, administering acute medical therapies
• Coordination of care with other care providers and consultants
In situ simulations

• In a performance improvement project

• Tested alternative work flows to identify pitfalls and equipment and personnel needs

• Used simulation with standardized patient (volunteer) to practice new work flows prior to real world execution
Opportunities

• Better team based care
• Process improvement
• Core clinical and technical proficiencies