STROKE TREATMENT

ED CULTURE CHANGE: OUR EXPERIENCE

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November 3. 2017
19th Annual Stroke Symposium in Kansas City
Disclaimer

- Board certified in emergency medicine
- I have no financial disclosures
- I have no conflict of interest
- I will not discuss any unlabeled or investigational uses of products
Objectives

▪ To look at stroke care at our community hospital
  ▪ review a recent case and treatment
▪ To highlight a coordinated-care approach in community stroke care and share our experience
Patient’s Initial presentation

- Patient’s pre-hospital stroke alert by EMS
- Patient arrives via EMS & taken to CT
- Code Stroke called
- Non-contrast head CT done
- Patient taken to ED critical room
- Chief Complaint “wife reports pt. was in bathroom when she heard a "crash and then another crash" at 0847 -- pt. having slurred speech and right sided weakness”
Physical Exam

- **General**: Alert, mild distress.
- **Eye**: Pupils are equal, round and reactive to light, extraocular movements are intact.
- **Ears, nose, mouth and throat**: Oral mucosa moist, no pharyngeal erythema or exudate.
- **Cardio/Resp**: Regular rate and rhythm, No murmur, Normal peripheral perfusion. Lungs are clear to auscultation, respirations are non-labored, breath sounds are equal, Symmetrical chest wall expansion.
- **Musculoskeletal**: No tenderness, no swelling, R sided weakness in arm and leg (unable to hold R arm off of bed), Not normal ROM,
- **Neurological**: profound R sided weakness, aphasia, Cognitive function: not normal thought processes, Speech: Slurred, Gait: not tested.
- **NIHSS 20**
- **Psychiatric**: Cooperative, appropriate mood & affect.
CT Head
Medical Decision Making

- **Differential Diagnosis:** Non-hemorrhagic or hemorrhagic CVA, seizure, syncope, hypoglycemia, etc.
- **Last Known Well:** 840
- **TPA ordered** Yes (forced field)
- **Head CT:** No acute process, by Radiologist as of 918
- **ED provider note @ 920:** TPA is a go
- **ED provider note @ 930:** Getting TPA bolus
CTA Head and carotids
CT perfusion
Medical Decision Making

- EDP note @ 1025 - occluded left M1 segment, L ICA reconstitution; will d/w KU when have report
- EDP @ 1030: Spoke with Dr. @ KU stroke who requested CT perfusion, thinks patient may be a candidate for endovascular intervention. We will obtain and find out if helicopter is available
- Images have been put on the cloud.
- ED note @10:33: Helicopter on standby
- ED note @ 1045: Accepted, helicopter
Our initial goal

- To improve the system stroke care at our community hospital
  - Stroke patients should receive the best available care regardless of their geographic location
- Recognized it requires internal cooperation, interdepartmental coordination and communication between facilities -> comprehensive stroke centers (them) and primary stroke center (us)
Why was this patient outcome possible?

- Because of a **coordinated approach to care**

- Required **changing the culture**
  - Recognized diversity in training/education
  - Decision to give TPA made by ED physician*
  - Decision to give TPA made independent of labs*
  - TPA administration by pharmacy
  - NIHSS done by nursing and EDP
Reaching out to providers

- Consideration of TPA contraindications
  - TPA & endovascular treatment are the treatments for CVA
- ED Provider owns the decision to treat
  - Role of collaboration
- Convincing providers TPA was beneficial
- Decided consultants would not second guess decision
Changing the internal culture

- **Pharmacist** immediately involved
  - Mix TPA early
  - Review contraindications too
- **Radiology** agreed to prioritize studies
  - Code Stroke
- **Labs** done emergent
  - Not always waiting on labs
Addressing the external culture

- EMS is vital component of stroke care
- Reached out to comprehensive stroke center (CSC)
Keeping success going

- Ensuring quality continues
- Touting success
- Success is contagious
- Looking for areas of improvement
<table>
<thead>
<tr>
<th>Neuro Consult before tPA (Y/N) &amp; Time</th>
<th>IP Neuro Consult (Y/N)</th>
<th>Symptom(s)</th>
<th>LKW to Door</th>
<th>Transport</th>
<th>EMS Call-ahead</th>
<th>Code Stroke Overhead Page</th>
<th>Provider Time</th>
<th>Door to Provider</th>
<th>ED Provider</th>
<th>Nurse</th>
<th>Pharmacist</th>
<th>Weight Estimated or Measured</th>
<th>Time Weight obtained</th>
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<td>Ischemic 12/29/2016 60 M 9:00 No</td>
<td>Clark Weakness</td>
<td>11:40</td>
<td>2:40</td>
<td>LCFM</td>
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<td>14:40</td>
<td></td>
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<td>0:00</td>
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<tr>
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<td>18:45</td>
<td>0:35</td>
<td>LCFM</td>
<td></td>
<td>14:25</td>
<td></td>
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<td>Beck Altered Sp</td>
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<td>2 days before</td>
<td>LCFM</td>
<td>yes</td>
<td>14:53</td>
<td>14:53</td>
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<td>0:10</td>
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<tr>
<td>Ischemic 1/9/2017 72 F Unknown n/a</td>
<td>Kumar Slurred spe</td>
<td>12:27</td>
<td>2 weeks prior</td>
<td>private</td>
<td>n/a</td>
<td>12:49</td>
<td></td>
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<td>Ischemic 1/11/2017 79 F 1/7/2017 12:00</td>
<td>Kumar Inappropri</td>
<td>15:05</td>
<td>4 days prior</td>
<td>private</td>
<td>n/a</td>
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<td>2:11</td>
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<td>15:22</td>
<td>night before</td>
<td>private</td>
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<td>19:10</td>
<td>4:10</td>
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<td>private</td>
<td>n/a</td>
<td>18:32</td>
<td></td>
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<td>9:35</td>
<td>9:35</td>
<td>night before</td>
<td>private</td>
<td>n/a</td>
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<td>0:04</td>
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<td>7:03</td>
<td>10:18</td>
<td>private</td>
<td>n/a</td>
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<td>15:57</td>
<td>this morning</td>
<td>private</td>
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<td>7:45</td>
<td>7:45</td>
<td>prior to arrival</td>
<td>private</td>
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<td>Beck LLE numb</td>
<td>19:32</td>
<td>3:10</td>
<td>private</td>
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<td>15:10</td>
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<td>private</td>
<td>n/a</td>
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</tbody>
</table>

Additional notes:
- tPA patient
- Arrival within 6 hours of LKW (or LKW unknown, patient delayed)

Handing off recipient: Patient attended.
<table>
<thead>
<tr>
<th>Patient Account #</th>
<th>Patient Name</th>
<th>Hemorrhagic or Ischemic Stroke</th>
<th>Arrival Date (if differs from admit)</th>
<th>Admit Date</th>
<th>Age</th>
<th>Sex</th>
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<tbody>
<tr>
<td>Neuro Consult before tPA (Y/N) &amp; Time</td>
<td>Symptom</td>
<td>LKW to Door</td>
<td>Transport</td>
<td>EMS call-ahead</td>
<td>Code Stroke Overhead Page</td>
<td>Provider Time</td>
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<tr>
<td>Provider Time</td>
<td>Door to Provider</td>
<td>ED Provider</td>
<td>Nurse</td>
<td>Pharmacist</td>
<td>Weight: Estimated or Measured</td>
<td>Time weight obtained</td>
</tr>
<tr>
<td>Door to Needle (Goal ≤ 60 min)</td>
<td>LKW to Needle</td>
<td>Arrival/Pre-tPA NIH</td>
<td>D/C NIH</td>
<td>Consistent NIH</td>
<td>Swallow Screen (Full Massey 10/4)</td>
<td>Oral intake after swallow screen pass</td>
</tr>
</tbody>
</table>
Door to tPA (all tPA patients)
Code Stroke tPA:
PT/INR Collection/Result Statistics

* Implemented new phleb response process
tPA Administration Times

Average Door to tPA Times & Volume by Quarter

- Average Door to tPA time
- Target
- Future Target
- N

4Q2015: 15
1Q2016: 18
2Q2016: 14
3Q2016: 13
4Q2016: 27
1Q2017: 23
2Q2017: 24

Minutes:
- 4Q2015: 50
- 1Q2016: 55
- 2Q2016: 60
- 3Q2016: 65
- 4Q2016: 70
- 1Q2017: 75
- 2Q2017: 80

4Q2015: 18
1Q2016: 23
2Q2016: 24
3Q2016: 27
4Q2016: 24
1Q2017: 23
2Q2017: 24

Graph showing trends in tPA administration times by quarter.
tPA Administration & Complication Summary

- Number of Patients
  - Stk Patients Receiving tPA
  - Post-tPA Complications

- Dates:

- Graph details:
  - Y-axis: Number of Patients
  - X-axis: Dates

- Chart shows the number of patients receiving tPA and the number of post-tPA complications for each date period.
Door to tPA Time Drill-Down
September 2015 – September 2016

- Average Door to CT
  - Goal < 25 min
  - LMH 16 minutes

- Average CT to CT Interpretation
  - Goal < 20 Minutes
  - LMH 5 Minutes

- Average CT to TPA admin
  - Goal < 15 Minutes
  - LMH 33 Minutes

- Average Door to tPA
  - Goal < 60 Minutes
  - LMH 54 Minutes
Questions?