Stroke Belt Consortium

10/26/12

West Central Florida Acute Stroke Council

WCF EMS Acute Stroke Advisory Committee

- Formed 2001
- 5 Original members
- Now > 100 members
- Interdisciplinary expertise

Please ask others to join!
(EMS, Hospitals)
Field Triage And Diversion of Acute Stroke

Charles Sand, MD

WCF Acute Stroke Advisory Committee

Purpose
To optimize acute stroke care in West Central Florida region by:
♥ Identify and treat stroke patients ASAP
♥ “BRAIN ATTACK”
♥ Public Education
   Symptoms
   Call 911
   Risk factors

WCF Acute Stroke Advisory Committee

Purpose
Standardize & optimize EMS Stroke Care:
♥ Dispatch
♥ Training and Education
♥ Protocols
♥ Transport to appropriate facility

WCF Region

♥ > 81 Hospitals
♥ 17 Counties
♥ 11-12 Helicopters
♥ 57 PSC (4/12)
   46 (4/09)
   43 (5/08)
   25 (9/06)
   15 (5/06)
♥ 10 Stroke Interventional Centers
   (6 Fla. Comprehensive SC)
EMS Triage

- Identify stroke patient
  - Cincinnati stroke scale (FAST)
  - LA Pre-hospital stroke scale (LAPSS)
  - Others
EMS Triage

Identify stroke patient

Advanced Triage (for Intervention):
- Frankfurt (LAG)
- Los Angeles (LAMS)

3 Item Stroke Severity Scale (Frankfurt)

For potential triage to Interventional Stroke Center

- **L** – LOC: Arouse without painful stimuli?
- **A** – Arm strength: Lift arm off stretcher?
- **G** – Gaze: Do eyes cross midline to visual or verbal stimuli?


LAG:

- 2 – No (not present)
- 1 – In between
- 0 – Yes (present)

If sum total = 5-6 then 100% had endocerebrovascular proximal clots or large bleeds

Field Triage And Diversion of Acute Stroke

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For potential triage to Interventional Stroke Center
LA Motor Scale (LAMS)

D – Droop (facial)
D – Drift (arm)
S – Strength (grip)


LAMS > 4
7X
likelihood large vessel occlusion

Field Triage and Diversion of Acute Stroke

Paul Banerjee, MD

Advanced Pre-Hospital Stroke Triage

Dr. P.R. Banerjee
Medical Director
Lake EMS

Acute Stroke – “Brain Attack”

Treatment Options for Acute CVA

- IV tPA
  - 0 - 3 / 4.5 hour window

- IA Thrombolysis
  - 0 - 6 hour window

- MERCI / Penumbra device
  - 0 - 9 hour window

- Clot Thrombectomy
  - 0 - 24 hours for Basilar Artery Occlusions / Thrombosis
Lake County is a rural county with 2 PSC
- Large population of retirees
- 42,745 calls in 2011 – 2012
- Covering 1,156 square miles
  - Population of 320,000
- 20 Ambulances and 13 Fire Departments
  - 750 EMS / Fire Rescue / SWAT medics
- 2009 Fundamentally changed how we treated both Ischemic and Hemorrhagic Stroke patients - Why?

2009 IV tPA Rates for CVA patients

- National Best practices = 15%
- National Good practices = 5%
- National IV tPA rates = 2%
- Our Local PSC’s = 1%
  - 33% - ICH / Death
  - Bronze Award Stroke Center!
- Obviously we had a problem!
Global View of Acute Stroke Patients

- It was not just about tPA rate of administration
  - Are PSC’s looking out for the patients best interests?
- To optimize treatment options for CVA patients
  - IV or IA tPA / MERCI / Penumbra / Coiling / Stenting
- How can we minimize the time to definitive treatment?
- How could we optimize the use of our local PSC’s without over burdening our CSC’s?

What are the Stroke Options?

- 2000 Brain Attack Coalition
  - Proposed 2 types of stroke centers
    - Primary – Basic acute stroke care < 3 hours
    - Comprehensive – 24 hour window for complex patients with severe deficits, requiring specialized surgical care
      - Endovascular interventions, clot removal, or stent placement
- How do we decide who goes where?

Pre-Hospital Stroke Screening Tools

<table>
<thead>
<tr>
<th>Primary Stroke Assessment</th>
<th>Positive Predictive Values</th>
<th>Negative Predictive Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cincinnati Pre-Hospital Stroke Scale (CPSS)</td>
<td>88%</td>
<td>75%</td>
</tr>
<tr>
<td>Face/ Arms/ Speech / Time (FAST) test</td>
<td>89%</td>
<td>73%</td>
</tr>
<tr>
<td>Los Angeles Pre-Hospital Stroke Screen (LAPSS)</td>
<td>87%</td>
<td>55%</td>
</tr>
</tbody>
</table>
Basic EMS Stroke Screening Tools

Cincinnati Stroke Scale
- Is it a stroke?
  - Initial field stroke screening

Los Angeles Motor Score
- How severe is the stroke?
  - Primary vs. Comprehensive Stroke Center
  - Based on the neurologic motor deficit
- We thought why not use BOTH?

Advanced Stroke Triage – Why?

EMS currently triages from the field:
- STEMI / New LBBB / VF ROSC
- Cardiac Arrest with Therapeutic Hypothermia
- Trauma Alert patients
- MCI
- Sepsis Alert patients
- Why NOT Acute Stroke patients?

Why Compare to Trauma Triage?

- Standardized criteria
- Approved statewide
- Paramedic Subjectivity
- Acceptable outcomes
  - Over triage rates 30%
  - Why?
Trauma alert patients brought to our local Level 1 Trauma center - Orlando Regional Medical Center

Compared Trauma alert data from Lake County and All other referring counties

We compared the percentages of trauma alert patients that needed acute intervention:
1. Immediate OR intervention < 60 min
2. OR intervention < 24 hours of arrival
   • Acute Stroke interventions occurred < 1 hr. and < 24hrs.

<table>
<thead>
<tr>
<th></th>
<th>TOTAL PATIENTS SENT</th>
<th>Total number of patients sent to the OR &lt; 60 min</th>
<th>% of Trauma alerts to OR &lt; 60 min</th>
<th>Pts. requiring OR &lt; 24 hours</th>
<th>% of Trauma alerts requiring OR &lt; 24 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake EMS Air</td>
<td>164</td>
<td>8</td>
<td>4.9%</td>
<td>16</td>
<td>9.8%</td>
</tr>
<tr>
<td>Lake EMS Ground</td>
<td>29</td>
<td>2</td>
<td>6.9%</td>
<td>5</td>
<td>17%</td>
</tr>
<tr>
<td>All Air</td>
<td>510</td>
<td>23</td>
<td>4.3%</td>
<td>42</td>
<td>8.2%</td>
</tr>
<tr>
<td>All Ground</td>
<td>971</td>
<td>55</td>
<td>5.7%</td>
<td>70</td>
<td>7.2%</td>
</tr>
</tbody>
</table>
LAMS Score

- Used a modified version of LAMS
  - 2007 UCLA pre-hospital stroke screening study
- 0–5 points = 3 item Motor stroke deficit scale
  - LAMS strongly correlated with the NIHSS
- LAMS Score ≥ 4 increases the likelihood of a Persisting Large Vessel Occlusion by 7 times
  - Neurologic deficits that produce significant long term disability are primarily caused by PLVO's
- 85% accuracy with the study
  - Sensitivity = 81%
  - Specificity = 89%

Lake EMS Pre Hospital Stroke Data

- 208 / 355 outcomes documented
- 40% of Comprehensive Stroke Care patients received some interventional stroke care
  - MERCI / Penumbra procedure
- Redirected 3 patients a month from each PSC

Lake EMS Stroke Data
Where Do we send our Acute Stroke Patients?

- Florida Hospital Waterman
- The Villages Regional Hospital
- Leesburg Regional Medical Center
- Saint Joseph’s Hospital
- Tampa General Hospital
- University of Florida Shands Gainesville
- Florida Hospital Orlando
- Halifax Medical Center

COMPREHENSIVE STROKE CENTER
- 25.4% patients
- Total Stroke Alert Patients receiving tPA = 20%
- Total Stroke Alert Patients receiving tPA for acute CVA as a final diagnosis = 55%

PRIMARY STROKE CENTER
- 4.2% local stroke patients
- Total Stroke Alert Patients receiving tPA = 8%
- Total Stroke Alert Patients receiving tPA for acute CVA as a final diagnosis = 21%

Lake EMS Stroke Triage Accuracy

<table>
<thead>
<tr>
<th>DISCHARGE DIAGNOSIS</th>
<th>LAMS 5</th>
<th>LAMS 4</th>
<th>LAMS 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute CVA</td>
<td>30</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>ICH</td>
<td>12</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Neoplasm</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Seizures</td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>TIA</td>
<td>1</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Comprehensive Stroke Cases</td>
<td>44 / 48</td>
<td>25 / 35</td>
<td>29 / 39</td>
</tr>
<tr>
<td>Accuracy PERCENTAGE</td>
<td>91.6%</td>
<td>71.4%</td>
<td>74.3%</td>
</tr>
</tbody>
</table>
Transport Times

- Average transport time to PSC: 17 minutes
  - 57% of acute stroke patients
- Average transport time to CSC: 48 minutes
  - 43% of acute stroke patients
- 24% of ALL comprehensive stroke patients were transported by air if the following criteria is met:
  - Patient instability
  - Inability to arrive by ground at CSC < 6 hours of time LSN

Contraindications to tPA and LAMS Score

- LAMS Score of 5 = 57%
- LAMS Score of 4 = 63%
- LAMS Score of 3 = 41%
- Even picked up 3 Pediatric brain tumors

Florida Hospital Orlando CVA Data Dec 2011 – March 2012

- Total patients sent with a LAMS 4 or 5 = 31
- Total tPA = 5 – 16%
- Total ICH = 9 – 29%
- INR Consult = 8 – 26%
- CT Perfusion Scan = 8 – 26%
- IV tPA / ICH / INR Consult / CTP = 23 – 74% accuracy rate
- Home = 39% + Rehab = 36% = 65%
  - Hospice = 33% SNF = 22% = 35%
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Florida Hospital Orlando Data
2009 - 2012
- Percentage of patients receiving acute intervention = **21%**
  - IVtPA / IA tPA / MERCI / ICH or Tumor
- Patients receiving a CSC specific intervention with higher LAMS scores of 4 - 5 (30 of 143 patients)
  - 8.2 days
- LAMS score of 1-3
  - 4.3 days

Lake EMS - What Did We Do?
- Community wide stroke awareness education programs
  - Don’t worry it was **FREE** in Health magazine
- Active participant in local PSC
  - Gold award for 1 of our 2 PSC – Local IV tPA rates is now **6.8%**
- West Central Florida Stroke Coalition
- State of Florida EMS Medical Directors endorsement
  - Template for stroke care for the state of Florida
- Validated our results when comparing to Trauma triage

Summary –
Know your Stroke Care Options
Treatment options
- Know your Interventional time windows
- Know each hospital’s capabilities
- Hold each hospital accountable
- **ALWAYS DO** what is best for YOUR patient
  - Treat your patients as you would want your family treated
- Be a **PATIENT** advocate NOT a hospital advocate
  - Work with local hospitals to optimize stroke care options that are available in your local community hospitals
    - Challenge the local Stroke Centers to “raise their game”
Field Triage and Diversion of Acute Stroke

Paul Banerjee, MD

Questions?
PBanerjee@LakeEMS.org

Because the people who are crazy enough to think they can change the world are the ones who do.

R.I.P. Steve Jobs