Acute Stroke: Pre-hospital Management and Field Treatment

Emergency Medical Services

- 29 – 65% persons with stroke symptoms rely on EMS for initial medical care
- Estimated 19 – 60% of stroke patients arrive in ER within 3hr of symptom onset
- Of those who arrive within 3hr, most arrive by EMS
EMS Activation

- Majority of EMS activation is by family member, caregiver, coworker, or bystander.
- 9-1-1 more likely to be called with increased severity of stroke, ICH, advanced age, sense of urgency.
EMS Transport

- Hospital arrival time shorter with 9-1-1 call vs. call to PMD, hospital
- Shorter time interval from symptom onset to hospital arrival
- Shorter time to physician evaluation, CT, Neurological exam
Emergency Medical Services
Assessment: Dispatch

Role: to triage and dispatch the appropriate provider

Dispatchers correctly identified 52% of patients who had a stroke based on initial phone evaluation

Needs priority dispatch as performed for acute myocardial infarction or trauma
Initial EMS Evaluation

- ABCs
- Cardiac monitoring
- IV access
- Finger stick glucose, VS
- Oxygen if required for O2 sat < 92%
- NPO
Initial EMS Evaluation

- Alert receiving ED
- Rapid transport to the closest appropriate facility capable of treating acute stroke
- Do not give dextrose containing fluids unless hypoglycemia is present
- Do not reduce blood pressure unless SBP > 220 or DBP > 120
- Do not administer excessive IVF
Symptoms of Stroke

- Focused history and assessment (LAPSS)
  - Time of symptom onset (last known well time)
  - Recent events (stroke, MI, trauma, surgery, bleeding)
  - Comorbid diseases (HTN, DM)
  - Medication use (anticoagulants, insulin, antihypertensives) Bring the meds or an accurate list

- Family should travel to hospital IMMEDIATELY

- Phone numbers of witness(es) to help clarify last known well time and history
EMS Management

- Transport hyperacute stroke patient as soon as possible with cardiac monitoring and IV access established en route
- Normal saline preferred fluid
EMS Management

The NIH Task Force repost “Improving the Chain
of Recovery for Acute Stroke in Your Community”
recommends identifying hospital capable of
providing acute stroke care and creating a
transport system to these centers based on
patient location.

System requires advanced planning and frequent
updating and should incorporate EMS
representative, community leaders, hospitals, and
physicians to ensure clear guidance for EMS
providers with regard to pt. destination.
Air Medical Transport

- May extend the range of thrombolytic therapy to more rural areas
- May facilitate early diagnosis and treatment of hemorrhagic stroke
- Mechanism for transport of patient for potential thrombolysis—cost effective
- May facilitate timely transfer of patient who received thrombolytic therapy at rural hospital through telemedicine services
Recommendations: Dispatch

- Public education programs to encourage use of 9-1-1 when signs and symptoms of stroke are seen.
- EMS Dispatch education to recognize stroke symptoms and appropriate notification of providers.
Recommendations: EMS Transport

- EMS rapid identification of stroke symptoms
- Eliminate stroke mimics
- Stabilization
- Rapid transport to the closest appropriate ED
- Notification of the receiving ED of incoming ‘code stroke’ patient
Recommendations: Community Providers

- Acute stroke treatment including use of t-PA
- Strategies to provide easy access to telemedicine or air medical transport for rural areas
Future Directions

- EMS pre-hospital delivery of potential neuroprotective agents
- Potential pre-hospital initiation of hypothermia protocols
- EMS involvement in the clinical research process
- UCLA FAST- Mag project
Time is Brain

- Systematic literature review:
- consensus estimate of # neurons, synapses, and myelinated fibers in human forebrain
- Volume of large vessel ischemic stroke
- Interval from onset to completion of large vessel stroke
# Time is Brain

<table>
<thead>
<tr>
<th></th>
<th>Neurons Lost</th>
<th>Synapses Lost</th>
<th>Myelinated fibers lost</th>
<th>Accelerated Aging</th>
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</thead>
<tbody>
<tr>
<td>Per Stroke</td>
<td>1.2 billion</td>
<td>8.3 trillion</td>
<td>7140 km</td>
<td>36 y</td>
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<tr>
<td>Per Hour</td>
<td>120 million</td>
<td>830 billion</td>
<td>714 km</td>
<td>3.6 y</td>
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<tr>
<td>Per Minute</td>
<td>1.9 million</td>
<td>14 billion</td>
<td>12 km</td>
<td>3.1 wk</td>
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<tr>
<td>Per Second</td>
<td>32,000</td>
<td>230 million</td>
<td>200 m</td>
<td>8.7 hr</td>
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Stroke Is a Medical Emergency Call 911!

• If you notice one or more of the warning signs for stroke,

GET HELP IMMEDIATELY!