Making the Most of Stoke Systems of Care

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Disclosures:
None!
Where do we stand on Stroke Systems of Care?

Why Develop Systems of Care?

“A fully functional stroke system of care that reduces stroke-related deaths by just 2%-3% annually would translate to 20,000 fewer deaths in the US alone and 400,000 world-wide”

“As a result, post stroke disability would be reduced, and improve quality of life, increase efficiency use of healthcare resources, and reduce financial burden on patients and families, third party payers and governments

Why Develop Systems of Care?

2015 AHA Focused Update on Stroke Treatment

- Patients should be transported rapidly to the closest available certified PSC or CSC.

- Regional systems of stroke care should be developed. (Class 1, LOE A) consisting of:
  - Hospitals than can provide r-tPA(PSC and CSCs)
  - Hospitals that can provide endovascular therapy

- It may be useful for PCS’s to perform noninvasive intracranial vascular imaging to select and transfer patients for endovascular intervention, reducing time to treatment. (Class IIb, LOE C)

Powers et al., Stroke. 2015;46:3020-3035

Building Systems of Care

Mission: Lifeline is the American Heart Association’s national initiative to advance “systems of care” for patients suffering from acute coronary syndromes (STEMI and NSTE-ACS), cardiac resuscitation and stroke.

“A system of care is an organized, coordinated effort in a defined geographic area that delivers the full range of care to all patients and is integrated with the local public health system. The true value of a system of care is derived from the seamless transition between each phase of care, integrating existing resources to achieve improved patient outcomes. Success of a system of care is largely determined by the degree to which it is supported by public policy.”
Mission: Lifeline Stroke- Objectives

Mission: Lifeline Stroke will develop a program to reduce barriers and delays in care by improving efficiencies in each system: Community, EMS, Emergency Department, Radiology, Laboratory, Endovascular lab, Critical Care Unit and Rehabilitation.

One of the cornerstones of the program is focusing on the “System” rather than each individual entity so that feedback can be gathered to improve quality of care for stroke victims.

Stroke Designation Public Policy to Date

- 12 states and Washington DC states have enacted public policies which recognize all three tiers of stroke facilities and require the development and implementation of transport protocol plans for acute stroke patients.
- These state successes were realized in: AZ, DC, IL, KY, LA, MN, NM, OK, NC, ND, RI, UT & WY.
AHA/ASA: Expanded Systems of Care

12 States and DC have enacted policies creating a statewide Stroke Registry.

30000 Foot View

Acute Stroke Ready or Primary Stroke Center

Comprehensive Stroke Center

Public

Patient

Ambulance/EMS

Call 911

Health Agencies

Physicians
Organizing Systems of Care

- Community education for symptoms & EMS activation
- EMS education for recognition and empowered for activation to higher level centers
- Limiting community hospital time/transfer time
- Efficient in-house triage, activation, treatment with endovascular to ≤ 90 minutes
Public Education/Community

- Need for improved knowledge in the community for stroke signs and symptoms
- Education for all
  - Target high risk populations
  - Community based organizations, policy makers and stakeholders

EMS

- Knowledgeable dispatchers
- Knowledgeable EMS Providers
- Assessment tools
  - Many
- Destination Protocols
  - Bypass?
  - Air VS Ground
- rtPA Checklists
EMS

- Collaborative relationship between stroke center and EMS for reduced transport delays and improved communication.
- Patient destination protocols utilized by EMS that address transport of stroke patients to primary stroke centers in accordance with law and regulation.
- Pre-notification of stroke patient arrival
- Provide educational events for EMS

Identifying LVO Severity Scales

- EMS Transport Criteria Should be Severity as Well as Time Based.
- Rapid Arterial Occlusion Evaluation Scale (RACE)
- Los Angeles Motor Scale (LAMS)
- NIHSS Stroke Scale
- Cincinnati Prehospital Stroke Severity Scale (CPSSS)
Mobile Stroke Units

Yes? No? Maybe So?

Treatment and Routing Options
HOT OFF THE PRESS!!

Mission: Lifeline

Does it matter?

LVO needs treated at an appropriate center

• Longer times from stroke onset to initiation of IA therapy and revascularization are associated with lower chances of good clinical outcomes

• Achieving reperfusion at 310 minutes, compared to 280 minutes, corresponds to a 10.6% decrease in the probability of a good outcome.

Khatri et al., Neurology 2009; 73 (13): 1066-1072
Stroke Centers and Acute Care

Stroke Center Characteristics

- **Academic Medical Center**
  - Tertiary Care Facility
  - Wide range of hospitals; standard stroke care; stroke unit; use TPA

- **Rural hospital**
  - basic care; drip and ship; use tele-technologies

**Comprehensive Stroke Center**

**Primary Stroke Center**

**Acute Stroke Ready Hospital**
Acute Stroke Ready Hospitals “The New Kid on the Block”

- Typically small facilities
- Located remotely away from a PSC or CSC
- Typically serve small cities or rural populations
- Stroke population small; likely 1 patient a week on average
- Limited staffing and bed availability
- Concept: EMS would take patient to nearest ASRH for:
  - initial diagnosis
  - acute stabilization
  - acute treatments
  - then send patient to nearest PSC or CSC

ASRH’s and Other Hospitals

- ASRHs have some type of relationship with one or more CSCs and PSCs
- Protocols for transfers and referrals
- Tele-stroke link to another facility
- Educational programs
- Transfer agreements (informal)
- Track transfers and outcomes

<table>
<thead>
<tr>
<th>Element</th>
<th>Comment</th>
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<tbody>
<tr>
<td>Acute Stroke Team</td>
<td>At least 2 members; staffed 24/7; at bedside within 15 minutes</td>
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<tr>
<td>EMS and ED Care Protocols</td>
<td>Annual training and education</td>
</tr>
<tr>
<td>Able to do rapid brain imaging and lab testing</td>
<td>45 minute turn around time</td>
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<tr>
<td>IV TPA protocol</td>
<td>60 minute door to needle time</td>
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<tr>
<td>Written transfer protocols</td>
<td>To a CSC ↓ PSC</td>
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<tr>
<td>Telemedicine link within 20 minutes</td>
<td>Procedures set up beforehand</td>
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Primary Stroke Centers

- Acute Stroke Team
- Written care protocols (IV tPA treatment)
- Emergency medical services
- Emergency department
- Stroke unit (could be within ICU)
- Neurology Services 24/7 in person or via telemed
- Neuroimaging Services 24/7 (CTA/MRA)
- Laboratory Services
- Outcomes and Quality improvement
- Continuing medical education
- Commitment and support of medical organization: Medical Stroke Director
PSC:

**Acute Stroke Team**
- Stroke Team is identified in writing:
  - The PSC documents roles/responsibilities and job description of the stroke team and shows reviews specific to being part of the stroke team.
  - Minimum team: A physician and another healthcare provider (nurse, NP, PA)
  - Someone from team should be available 24/7- may use telemedicine (phone or robot)
  - Acute Stroke Log- Now a Joint Commission Requirement
  - Track all acute stroke metrics: Door to…….
  - Registry (GWTG)- some track acute stroke metrics as well as all stroke patients

PSC:

**Written Care Protocols**
- Designed, updated, and utilized by the stroke team
- Written protocol for patients eligible for tPA, or other therapies
- Written protocol for acute care in the ED: stabilize vital signs, neuroimaging, management of non-acute strokes and hemorrhagic stroke.
- Goal of protocols is to:
  - Reduce tPA complications
  - Administer tPA within the time windows
  - Standardize care of the stroke patient
- Available for ED and Inpatient Strokes
- Review/update once a year
PSC

Emergency Department

- Personnel should be trained to recognize, diagnose and treat all types of stroke: acute and nonacute.
- Aware of Stroke team and when to activate
- Document Acute Stroke metrics (Last known well, Door to doc, door to CT, door to CT read…..)
- 80% of ED practitioners can:
  - Demonstrate knowledge of EMS to ED protocols
  - Location and use of stroke protocols
  - Care of the patient with acute stroke
  - Diagnose acute stroke
  - Utilize protocols for acute stroke
  - Understand treatment options for acute stroke
  - Monitor acute stroke
  - Participate in stroke education activities at least twice a year

Comprehensive Stroke Centers

- Dedicated neuro ICU with 24/7 staffing
- Catheter angio24/7
- Able to meet concurrent needs of multiple complex stroke patients
- 24/7 neurointerventionalist, neurosurgeon, neurologists
- Aneurysm clipping/coiling, carotid stenting/CEA, endovascular care
- Patient centered stroke research

- Volume Requirements
  - 20 SAH/year
  - 15 Endovascular coiling and surgical clippings per year for aneurysm
  - 25 IV tPA eligible patients per year (50 over 2years)

- Advanced Imaging requirements 24/7
  - Catheter Angiography
  - CTA
  - MRI and MRA
  - Other diagnostic modalities available on site-carotid duplex. Extracranial ultrasonography, TCD, TTE and TEE
Comprehensive Stroke Centers

- Post hospital care coordination
  - f/u phone calls
  - Case manager/social worker involvement
  - PT/OT/Speech
  - In-depth look at patients and family ability to provide care, depression screening, and resources for support after discharge
- Educated Neuro ICU for complex stroke patients
  - 24/7 on site staff with neurovascular training
- Research and written research protocols
  - Active IRB studies
  - List of patients enrolled
- Interdisciplinary program level review of OPPE and peer review
- Performance measures- Both PSC and CSC
Subacute Care and Secondary Prevention

The treatment of stroke patients during the subacute phase, including the early implementation of secondary prevention regimens, is critical to optimizing patient outcomes. Well established evidence-based guidelines are focused on subacute care and secondary prevention for stroke.

- Stroke teams
- Stroke units
- Written protocols
- Order Sets
- Neuroscience nurses, educated in the optimal management of the stroke patient.

Secondary Prevention

A stroke system should adopt approaches to secondary prevention that address all major modifiable risk factors and that are consistent with the national guidelines for all patients with a history or suspected history of stroke or transient ischemic events.
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Rehabilitation

Stroke rehabilitation should be provided by an appropriately trained and staffed multi-disciplinary team, including

- Neurorehabilitation physicians
- Rehabilitation nurses
- Physical and Occupational therapists
- Speech-language pathologists,
- Recreational therapists, social workers, neuropsychologists
- Vocational counselors

- Families and the patient should be a fully involved member of this team.
Rehabilitation

Benefits

• The intensity of rehabilitation services often is a critical determinant in the recovery of stroke patients.

• The use of coordinated, multidisciplinary stroke rehabilitation teams has been shown to diminish mortality rates for stroke patients.

• In addition, stroke patients who receive care in an inpatient rehabilitation facility are more likely to return to the community and to recover their ability to perform ADLs.

Rehab CEQI

• Mortality
• Functional status
• Community discharge
• Percentage of stroke patients who receive the appropriate level of rehabilitation services in the system
Returning to the Community

- Resources in the Community
- Resources at Home
- Family assessment
  - Respite Care
  - Depression
  - Stress
  - Coping
- Return to Work