What does it mean to be a Primary Stroke Center?

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Recommendations for the Establishment of Primary Stroke Centers

Table 1: Evidence of Prioritization

<table>
<thead>
<tr>
<th>Evidence Type</th>
<th>Critical Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Outcomes</td>
<td>Improve patient outcomes, reduce mortality, enhance quality of care</td>
</tr>
<tr>
<td>Economic Impact</td>
<td>Reduce hospital costs, improve resource allocation</td>
</tr>
<tr>
<td>Operational Impact</td>
<td>Enhance hospital operations, improve efficiency</td>
</tr>
<tr>
<td>Long-term Benefits</td>
<td>Increase patient satisfaction, enhance hospital reputation</td>
</tr>
</tbody>
</table>

Objective: To develop recommendations for the establishment and operation of primary stroke centers in order to improve the care of patients with stroke.

Participants: Members of the Brain Attack Coalition (BAC) in a multidisciplinary group format developed recommendations for the establishment and maintenance of a Primary Stroke Center.

Recommendations:

1. **Clinical Outcomes:**
   - Establish a protocol for rapid assessment and treatment of patients with stroke.
   - Ensure availability of intravenous thrombolytics and endovascular treatment.
   - Implement a system for early identification and treatment of patients with hemorrhagic stroke.

2. **Economic Impact:**
   - Reduce hospital costs by implementing streamlined processes and improving resource allocation.
   - Increase reimbursement levels for stroke care.

3. **Operational Impact:**
   - Develop a system for efficient referral of stroke patients.
   - Implement a quality improvement program for stroke care.

4. **Long-term Benefits:**
   - Enhance patient satisfaction by improving the overall experience for stroke patients.
   - Improve the reputation of the hospital and attract more referrals.

Conclusion: The establishment of primary stroke centers is critical for improving the care of patients with stroke. These centers have been shown to improve clinical outcomes, reduce mortality, and enhance patient satisfaction.

References:


Preclinical Commentary:

Despite technological advancements and improvements in stroke care, the establishment of primary stroke centers has been slow. However, recent studies have shown that such centers can significantly improve patient outcomes and reduce mortality. The key to success lies in the commitment of hospital administrators to invest in the necessary infrastructure and equipment, as well as in the training of healthcare professionals.

In conclusion, the establishment of primary stroke centers is a critical step in the improvement of stroke care. By implementing the recommendations outlined in Table 1, hospitals can achieve significant clinical and economic benefits, as well as positive long-term outcomes for patients with stroke.

Keywords: Stroke, Primary Stroke Centers, Clinical Outcomes, Economic Impact, Operational Impact, Long-term Benefits.
What are the goals of a Primary Stroke Center?

- Increased use of appropriate diagnostic and therapeutic acute stroke treatments.
- Reduced peristroke complications.
- Improved patient outcomes.
- Same level of care 24/7/365.

Joint Commission Certification

- Joint Commission Primary Stroke Center Certification requirements are in alignment with the Brain Attack Coalition (BAC) recommendations.
- To become certified you must demonstrate all 11 major elements of performance recommended by the BAC.
Major Elements of Performance

- Hospital and Administrative Support.
- Acute Stroke Team
  - Made up of at least a minimum, a physician and nurse trained in the diagnosis and treatment of the acute stroke patient and available 24/7.
  - A way of activating the team and having them respond to patient’s bedside within 15 minutes.
  - A patient log must be kept.

Major Elements of Performance

- Written Care Protocols:

  OHSU HEALTH CARE SYSTEM
  PRACTICE STANDARD

  **Acute Stroke Practice Standard for the Emergency Department**
  (includes ischemic stroke, TIA's, intracerebral hemorrhage, and non-subarachnoid hemorrhage)
  Last Reviewed Date: 2/2/11

  **STATEMENT OF STANDARD**

  OHSU Hospitals and Clinics have adopted this practice standard in order to delineate a consistent, evidenced-based approach to treating the patient who presents with signs and symptoms consistent with acute stroke. Although this standard assists in guiding care, responsibility to determine appropriate care for each individual remains with the provider themselves.

<table>
<thead>
<tr>
<th>Outcomes/Goals</th>
<th>Triage Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rapid identification of vascular events.</td>
<td>1. Document chief complaint: Sudden onset of numbness, weakness, difficulty speaking, vision change, or incoordination that are present, improving, or have resolved.</td>
</tr>
<tr>
<td>2. Manage appropriately and efficiently according to Brain Attack Coalition guidelines.</td>
<td>2. Screen for suspected acute stroke using the “Cincinnati Prehospital Stroke Scale,” one positive finding and onset of symptoms &lt;12 hours or less the patient trigger level is ESI Level 1 or 2 per patient condition.</td>
</tr>
<tr>
<td>3. Evaluate in a cost-effective manner.</td>
<td>3. Move immediately to an acute in-room and notify ED physician, charge nurse, and HUC.</td>
</tr>
<tr>
<td></td>
<td>4. Consider calling Rapid Response Team if needed.</td>
</tr>
<tr>
<td></td>
<td>5. If onset of symptoms is greater than 12 hours or symptoms have resolved and ABC’s are stable, then trigger level may be ESI Level 3. May upgrade the trigger level based on nursing judgment.</td>
</tr>
<tr>
<td></td>
<td>6. Registration to be done at bedside.</td>
</tr>
</tbody>
</table>
Major Elements of Performance

- Emergency Medical Systems
  - EMS/ED are integrated in care and transport of stroke patients.

- Emergency Department
  - ED staff demonstrate familiarity with protocols and demonstrate use.

Major Elements of Performance

- Stroke Units
  - Does not require specific enclosed unit, but must be a unit where majority of patients are admitted. (ED, ICU, Acute Care).
Major Elements of Performance

- Neurosurgical Services available within 2 hours, by transfer, if necessary.
- Neuroimaging—24/7 basis
  - Able to obtain brain image within 25 minutes and interpretation within 20 minutes of completion.

Major Elements of Performance

- Laboratory Services
  - Stroke labs within 45 minutes from order on 24/7 basis.
  - ECG and chest x-ray within 45 minutes from order, when clinically indicated.

- Outcome and quality improvement activities.
- Educational programs.
Comprehensive Stroke Center

• Health care personnel with specific expertise in a number of disciplines, including neurosurgery and vascular neurology.

• Advanced neuroimaging capabilities, such as MRI and various types of cerebral angiography.

• Surgical and endovascular techniques, including clipping and coiling of intracranial aneurysms, carotid endarterectomy and stenting, and intra-arterial thrombolytic therapy.

• Infrastructure and programmatic elements such as an intensive care unit and stroke registry.

The Power of Data

• Over 1600 patients in our database allows for analysis of trends and identification of performance improvement projects.

• Data can be extracted and shared with direct care providers.
  - A way to show them how their efforts impact care in a positive manner.
  - Motivation to improve in areas needing attention.

• The Neurosciences Best Practices group selects & monitors the annual performance improvement (PI) projects. PI efforts are coordinated by the CNS, but all members of the team are involved in developing & implementing systems solutions.
<table>
<thead>
<tr>
<th>Stroke Measures</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVT prophylaxis</td>
<td>100%</td>
<td>100%</td>
<td>99%</td>
<td>100%</td>
</tr>
<tr>
<td>Discharged on antithrombotics</td>
<td>98%</td>
<td>99%</td>
<td>100%</td>
<td>99%</td>
</tr>
<tr>
<td>Anticoagulation for Afib</td>
<td>57%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>% who arrive in ED within 120 min. of onset who receive tPA</td>
<td>44%</td>
<td>86%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Antithrombotics started within 48 hours of admit</td>
<td>94%</td>
<td>96%</td>
<td>99%</td>
<td>99%</td>
</tr>
<tr>
<td>LDL&gt;100 discharged on cholesterol reducing agent</td>
<td>7%</td>
<td>90%</td>
<td>99%</td>
<td>99%</td>
</tr>
<tr>
<td>Bedside swallow screen prior to any PO</td>
<td>80%</td>
<td>69%</td>
<td>74%</td>
<td>81%</td>
</tr>
<tr>
<td>Patient/family stroke education provided</td>
<td></td>
<td></td>
<td>94%</td>
<td>95%</td>
</tr>
<tr>
<td>Tobacco cessation provided during hospital stay</td>
<td>19%</td>
<td>96%</td>
<td>98%</td>
<td>99%</td>
</tr>
<tr>
<td>Assessed for rehab needs</td>
<td></td>
<td></td>
<td>99%</td>
<td>99%</td>
</tr>
</tbody>
</table>

% Compliance with documented bedside swallow screen prior to oral intake

<table>
<thead>
<tr>
<th>Quarter</th>
<th>4th Qtr 08</th>
<th>1st Qtr 09</th>
<th>2nd Qtr 09</th>
<th>3rd Qtr 09</th>
<th>4th Qtr 09</th>
<th>1st Qtr 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compliance</td>
<td>60%</td>
<td>70%</td>
<td>80%</td>
<td>90%</td>
<td>100%</td>
<td>90%</td>
</tr>
</tbody>
</table>
Critical Success Factors

- Examples of hardwiring changes include:
  - Preprinted order sets.
  - Readily available evidence-based guidelines & quick reference lists.
  - Consistent message from staff physicians to residents about expectations.
  - Finding ways to make electronic medical record work in your favor, incorporating ideas from direct care nurses and physicians.
  - Involving the Rapid Response Team to provide immediate and consistent nursing evaluation and expertise paired with rapid initiation of the Stroke Team response, when indicated.

Critical Success Factors

- Interdisciplinary team collaboration essential to success.
  - Early involvement of the leadership of key stakeholders.
  - Go to all the members of the direct care team (nurses, physicians, speech therapists, etc.) for ideas, they know the barriers as well as the solutions.
  - One on one coaching of nurses and physicians.
Critical Success Factors

• The Service Line structure, which includes EMS through to discharge placement, enhances the ability to analyze and optimize how patients move through the system.
  – It allows for more team thinking of how we all work together to provide an efficient & optimal patient experience, rather than just thinking in silos about what occurs in and would work best for my own department.

• Regular communication among stakeholders through an organized committee/advisory group structure helps to reinforce the team concept, helps to identify common goals, sets clear priorities, and builds positive working relationships.

Oregon Stroke Center (OSC) at OHSU

• The OSC offers regional access to acute stroke treatment 24/7.

• The team physically evaluates patients at 4 Portland-area hospitals.

• In addition, the OSC stroke physicians provide phone consultation on stroke management and patient transfer for physicians who call from Oregon, Washington, and Idaho.

• Calls go through the OHSU Transfer Center and are sent to a single Stroke Code pager activating the Stroke Team.
• The physician responds to the initial page within 5 minutes. After discussion with the caller, the stroke physician determines whether the patient is a potential candidate for acute stroke treatment and activates the appropriate code through the Stroke Team pager.

• The Stroke Team physician and coordinator travel to the site where the patient is located. Depending on the case, the neurointerventionalist team on-call may be alerted at this time.

• Simultaneously, the patient may be undergoing further diagnostic workup per the advice of the stroke physician.

• The stroke physician and clinical coordinator reach the patient site as soon as possible, but within 30 minutes (for the 4 area hospitals).

• They work together and guide the existing staff through appropriate care for the patients.

• For patients outside these facilities, the stroke physician may arrange for transfer of the patient to a facility that has the resources necessary for tertiary acute stroke care.
Critical Success Factors

- This level of consistent response 24/7 is possible through the assembling of a large team of players willing to take call: 6 area stroke neurologists, and 6 coordinators. OHSU also has 5 cerebral fellowship trained neurointerventionalists.

- OSC members meet regularly to share protocols and review cases.

- Local EMS systems collaborate and share the same stroke response protocols.

- This process takes the team concept out beyond the confines of an individual facility and expands it to the continuum from EMS to the ED to the ICU, across an entire region. And reduces the variation of what is provided for acute stroke management.

Future Directions: Telemedicine/Telestroke

- What is telestroke?
  - Use of telecommunications technologies to provide medical information and services.
  - Interactive full-motion audio and video for acute stroke care was first used in the early 1990’s.
Future Directions: Telemedicine/Telestroke

- Technology continues to be refined and now includes dedicated, high-quality, interactive, bi-directional audiovisual systems combined with teleradiology for rapid viewing of brain images, and software that prompts you through the various aspects of an acute stroke workup.

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Future Directions: Telemedicine/Telestroke

- The consulting provider can interact with the patient and/or their family and view aspects of the physical exam.
Future Directions: Telemedicine/Telestroke

Why move in this direction?

- Outside the urban areas in Oregon there is limited access to neurologists.
- Regional partnerships can ensure more consistent availability of acute stroke treatment across communities and improve access to consults with stroke neurologists.
- More patients can stay in their home community, and patients that need to be transferred can do so.

Future Directions: Telemedicine/Telestroke

- Regional stroke networks can be made of comprehensive stroke centers linked in with primary stroke centers, and stroke-ready hospitals.
- This model has been shown to increase the numbers of patients receiving acute stroke treatments, in quicker timeframes, and with improved outcomes.
Stroke Advisory Group

- Nurse Educators:
  - Erin Reback
  - Ellie Roberts/Jackson Wild
  - Mercedes Wilson
- ED Leadership:
  - Drs. Daya, Sahni, and Schmidt
  - Denise Foster
- Radiology
  - James Anderson, MD, and Erwin Schwarz
- Laboratory
  - MD Leader, Juanita Peterson
- Interventional Suite
  - Stanley Barnwell, MD
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- Neurology
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  - Helmi Lutsep, MD
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  - Randy Ward
- Hospital Therapy Services
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  - Michael Rennick
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  - Margie Harvey
  - Pat Ivie
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  - Mike Brownlee
- Care Management
  - Shannon Coady
  - Karen Prescott/Claire Llewellyn
- Stroke Program Coordinator
  - Karen Ellmers
- Administration
  - Mark Lovgren
  - Judi Workman
  - Chuck Kilo

Bibliography