Stroke in the Rural Setting: How You Can Make A Difference.

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Providence Stroke Center
Portland, OR
Outline

- State Statistics
- The Oregon Problem
- Time & Treatments
- Steps to Making a Difference
- The Future
- Resources
• Third leading cause of death
• Leading cause of adult disability
• Leading diagnosis from hospital to LTC
• $181 million... total cost of stroke hospitalizations in 2006 (OR)
• OR 5th highest stroke death rate

Figure 2.1. Leading Causes of Death, Oregon, 2005

Source: 2005 Oregon Death Certificates
State Stroke Systems Hospital Mapping Initiative

Oregon: Age 35+ Stroke Death Rate per 100,000 by County

Confidential

SSSP Designation
- Joint Commission Primary Stroke Center
- Acute Stroke Capable
- No Response
- Not Acute Stroke Capable or Govt/Military

Stroke Death Rate
- Class 1 (61-113)
- Class 2 (114-123)
- Class 3 (124-133)
- Class 4 (134-146)
- Class 5 (147-241)

Hospital Definitions
Primary Stroke Center - Certified by The Joint Commission
Primary Stroke Centers (Other) - State Designated
Acute Stroke Capable - Hospital self-identifies they treat acute stroke patients
Non Responder - Hospital does not respond to request or provide information
Non Acute Stroke Capable - Hospital self-identifies they do not treat acute stroke patients
Govt or Military Hospital - Govt or military facility & acute stroke treatment capabilities are unknown
Service Areas for Joint Commission Primary Stroke Centers - Oregon

- Yellow: Ground Transportation (60 Minutes One-Way)
- Orange: Ground Transportation (90 Minutes One-Way)
- Brown: Air Transportation (90 Minutes Roundtrip)

Additional Information:
- Treatment capability (150 minutes)
- Recognition time (20-30 minutes)
- Transport time (30-60 minutes)
- Treatment time (30 minutes or less of our time)

Transport time includes dispatch, scene evaluation, etc.

Total treatment capable population = population within driving distance + population within air transport distance

This map shows travel times to PSCs only. However, other hospitals can also give 3-3A for stroke. Contact your hospital for more information.
Problem……

- Small rural hospital Oregon (Oct. 2008):
  - Want to give most up to date stroke care
  - Limited resources:
    - Not a Primary Stroke Center
    - No Neurology coverage
    - Limited N. Surgery, pharmacy, radiology, Hospitalist coverage
    - Limited knowledge of tPA / specialty care

- “How can we better serve our patients?”
Stroke Treatment in Rural Oregon

- Local treatment is necessary due to Time dependent therapy and long distances between people and tertiary facilities capable and experienced with treatment

- Minimum requirements for administering thrombolytic therapy are:
  - CT scanner 24/7
  - EMS Protocol for expediting transport & pre-notification
  - Acute care/t-PA protocol
In the US only 4% stroke patients receive the only FDA approved treatment for acute stroke

- Patients don’t often recognize their symptoms as stroke and don’t understand the need to seek emergent care via 911
- Primary providers have very little training or experience in treating stroke patients let alone use of t-PA
- Neurologists are in short supply and clustered in urban areas
- Until recently there was no economic incentive to treat acute stroke
Stroke Treatment.. (Ischemic)

- t-PA approved in 1996... ONLY APPROVED MEDICATION
- Must be given w/in 3 hrs of onset (last normal)
- Requires neurological expertise, urgent CT scanning
- PROTOCOL necessary
- Primary Stroke Centers
  - Protocols, experts, guidelines, registries, data, quality improvement, outcomes
Oregon, 2009

- TJC certified Primary Stroke Centers
  - Providence St. Vincent’s, 2004
  - Legacy Good Samaritan, 2004
  - Legacy Meridian Park, 2004
  - Providence Portland, 2005
  - Rogue Valley (Medford), 2006
  - OHSU, 2007
  - Sacred Heart (Eugene), 2008

*24/7 Comprehensive Capability
Treatment Options / Comprehensive Stroke Centers

- IV t-PA
- Intra-arterial t-PA
- Intra-arterial devices (up to 8 hr window)
- Clinical Trials
  - Drugs and devices
- Hypothermia
Rural Oregon... the beauty and the challenge.
Making a difference in your hospital & community…YOU CAN:

- Find a clinical champion
- Recruit administrative support
- Assess resources (Pharmacy, Radiology, Lab, etc)
- Develop protocols (ED & in-patient)
- Work closely with first responders
- Relationship with experts for advice / transfer
- EDUCATE staff
- Educate community
- Quality review processes
Pre-Hospital Stroke Care

Scoop and go! Pre-notify Hospital
Montana Stroke Initiative Pre-hospital Stroke Screening Scale

1. Patient Name: ________________________________

2. Informant/History from __________________ Phone# ( ) ___-____
   [ ] Patient  [ ] Family  [ ] Other

3. Time last seen normal/baseline and awake __:__ __/__/____

<table>
<thead>
<tr>
<th>Screening Criteria</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F</strong>acial Droop – ask patient to show teeth and smile</td>
<td>![Image of facial droop test]</td>
<td>![Image of facial droop test]</td>
</tr>
<tr>
<td><strong>A</strong>rm Drift – ask patient to extend arms, palms down, with eyes closed</td>
<td>![Image of arm drift test]</td>
<td>![Image of arm drift test]</td>
</tr>
<tr>
<td><strong>S</strong>peech Abnormal– ask patient to say “You can’t teach an old dog new tricks”</td>
<td>![Image of speech test]</td>
<td>![Image of speech test]</td>
</tr>
<tr>
<td><strong>T</strong>est</td>
<td>![Image of speech test]</td>
<td>![Image of speech test]</td>
</tr>
</tbody>
</table>

All Yes?

Call receiving hospital with “Code Stroke”
Neurological Assessment
Patient With Stroke-Like Symptoms

Exam elements:
- Level of consciousness
- Pupils and gaze
- Arm and leg motor exam
  - strength and overall coordination
- Facial symmetry and smile effort
- Speech and understanding
  - Slurred speech
  - Clear but nonsensical speech
  - Problems understanding simple commands
The Emergency Room
Montana Stroke Initiative
Acute Stroke Orders

Rural & Frontier Hospitals - Emergency Department Protocol

Patient Name:_________________ MR#_________________ Date:_____/_____/_____

Mode of Transport: □ Private Vehicle □ EMS □ Prehospital Screen Used

Times: Symptom Onset or Last Seen Normal:__________
       Arrival to Emergency Department:__________

Initiate the following orders:

___ Vital signs now and q15 minutes: Initial BP ___/___ Temp ___ °F
___ Neurologic Exam now and q30 minutes
___ mNIH Stroke Scale Score _____ (see next page)
___ Cardiac Monitor
___ O2 per NC or Mask to keep O2 sat >92%
___ IV: 18 gauge. Start 0.9 NS @ 75 cc/hr
___ STAT CBC, Basic Metabolic Panel, UA, Troponin, PT/PTT, INR ______
___ STAT finger stick blood glucose if not already done ______
___ STAT EKG
___ Accurate weight in Kg. ______
___ NPO
___ Tylenol for rectal T > 99.5
___ Foley catheter if severely impaired
___ No heparin, aspirin, or Coumadin
___ Elevate head of bed to 20-30 degree
___ Stat CT if available

BP Management: Do not attempt to lower BP unless BP >220/120 on two separate measurements 15 min. apart

Is patient a candidate for: Acute Thrombolytic Treatment (see below) □ Yes □ No
Transfer to a Stroke Center (see form) □ Yes □ No

Date:_____/_____/______ Time:_____ Physician Signature _______________________

This protocol available at http://www.montanastroke.org
### Montana Stroke Initiative Acute Stroke Care Plan

**Rural & Frontier Hospitals**

<table>
<thead>
<tr>
<th>Time</th>
<th>Actions</th>
<th>Quality Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Patient Arrival</strong></td>
<td>□ Private □ EMS □ Prehospital Screen</td>
</tr>
<tr>
<td></td>
<td><strong>Provider Assessment</strong></td>
<td>Vitals including wt. completed Y/N</td>
</tr>
<tr>
<td></td>
<td>1. ABCs/ Vitals</td>
<td>mNIHSS completed Y/N</td>
</tr>
<tr>
<td></td>
<td>2. History Onset/ Time Last Seen</td>
<td>Normal ______</td>
</tr>
<tr>
<td></td>
<td>3. Warfarin / Antiplatelet</td>
<td>Yes □ No</td>
</tr>
<tr>
<td></td>
<td>4. General Exam</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Perform mNIHSS</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Initial Care</strong></td>
<td>NPO noted Y/N</td>
</tr>
<tr>
<td></td>
<td>1. O2 Sat&gt;92%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Keep NPO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Initiate BP Protocol</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Treat Temp &gt;99.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Diagnostics</strong></td>
<td>Labs completed Y/N</td>
</tr>
<tr>
<td></td>
<td>1. Labs: CBC, PTT, PT/INR, Lyes, Glucose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. EKG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. CT Performed Stat</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Level of Care</strong></td>
<td>Discussed treatment options including t-PA Y/N</td>
</tr>
<tr>
<td></td>
<td>Does patient/family desire aggressive treatment/resuscitation efforts?</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Disposition Decision</strong></td>
<td>Admitted / Transferred Y/N</td>
</tr>
<tr>
<td></td>
<td>1. Treatment Candidate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Transfer Patient</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Admit Patient</td>
<td></td>
</tr>
</tbody>
</table>
## Montana Stroke Initiative
### Modified NIH Stroke Scale

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Scoring Guide</th>
<th>Patient Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOC Questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Age</td>
<td>0=Answers both correctly</td>
<td></td>
</tr>
<tr>
<td>2. Name</td>
<td>1=Answers one correctly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2=Answers neither correctly</td>
<td></td>
</tr>
<tr>
<td>LOC Commands</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Open and close eyes</td>
<td>0=Performs both correctly</td>
<td></td>
</tr>
<tr>
<td>2. Open and close hand</td>
<td>1=Performs one correctly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2=Performs neither correctly</td>
<td></td>
</tr>
<tr>
<td>Gaze</td>
<td>0=normal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1=partial gaze palsy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2=total gaze palsy</td>
<td></td>
</tr>
<tr>
<td>Visual Field Cut (homonymous)</td>
<td>0=no visual loss</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1=partial field cut</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2=complete field cut</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3=no vision</td>
<td></td>
</tr>
<tr>
<td>Left Arm Motor</td>
<td>0=no drift</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1=drift before 10 seconds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2=fails before 10 seconds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3=no effort against gravity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4=no movement</td>
<td></td>
</tr>
<tr>
<td>Right Arm Motor</td>
<td>0=no drift</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1=drift before 10 seconds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2=fails before 10 seconds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3=no effort against gravity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4=no movement</td>
<td></td>
</tr>
<tr>
<td>Left Leg Motor</td>
<td>0=no drift</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1=drift before 5 seconds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2=fails before 5 seconds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3=no effort against gravity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4=no movement</td>
<td></td>
</tr>
<tr>
<td>Right Leg Motor</td>
<td>0=no drift</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1=drift before 5 seconds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2=fails before 5 seconds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3=no effort against gravity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4=no movement</td>
<td></td>
</tr>
<tr>
<td>Sensory</td>
<td>0=normal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1=abnormal</td>
<td></td>
</tr>
<tr>
<td>Language</td>
<td>0=normal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1=mild aphasia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2=severe aphasia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3=mute or global aphasia</td>
<td></td>
</tr>
<tr>
<td>Neglect</td>
<td>0=normal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1=mild</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2=severe</td>
<td></td>
</tr>
</tbody>
</table>

**Total Score (out of 31)**  

This protocol available at [http://www.montanastroke.org](http://www.montanastroke.org)
Beware!
Common errors to avoid….

- **Blood Pressure**
  - Do not treat elevated blood pressure unless > 220 systolic or, diastolic > 115
  - Treating with t-PA must be below 185/110
  - The brain needs the perfusion, can worsen stroke if lower blood pressure too low

- **IV Fluids**
  - Avoid glucose containing solutions
  - Correct hypotension and volume deficits from dehydration otherwise run fluids TKO
Two pts both present w/ L sided weakness:
A. Ischemic stroke R. hemisphere – not yet visible
B. R. hemispheric intracerebral hemorrhage
tPA Administration Considerations

- Must be started before 3 hours from onset (last normal)
- No blood on head CT
- Review patient’s history for other risk factors
- Accurate inclusion / exclusion
- Record weight
- BP less than 185/110 to treat

http://www2.massgeneral.org/stopstroke/protocolThromIVAdmin.aspx
Hemorrhage Suspected

- STOP TPA INFUSION, call MD immediately
- Stat head CT without contrast
- Draw blood for PT, PTT, plt ct, fibrinogen, and type and hold
- Prepare for administration of cryo and or platelets
Drip and Ship?
Remote Expert Options:

Phone Consultation

503-494-9000

Bring the expert to you via Telestroke

Future?
Other Treatment Options for Ischemic Strokes

- If symptom onset is greater than 3 hrs ~
- consider up to 8 hrs:
  - Interventions (IA, Merci, stenting)
  - Clinical Trials
Treatment Cont…

- If not a tPA candidate, ASA in ED. Rectal ASA if fails swallow eval. or if swallow eval. not complete.

- **Keep NPO, until a formal swallow eval. is done.**

- Admit as Inpatient and perform diagnostic testing: Carotid US, Echo, TEE, ECG monitoring for a-fib, MRI, fasting Lipid, Clotting disorder blood work (Antiphospholipid, Factor V, Antithrombin III)

- Rehabilitation
BEDSIDE SWALLOW SCREEN

Patient Name: __________________________

Baseline O₂ sat: ________________ Monitor O₂ sat throughout screen.

Please initial the line to indicate patient's endpoint and write brief summary in Progress Notes or ED Record.

When finished, place this form in the "Nursing Flow Sheet and Vitalts" tab of patient chart.

Assist the patient with oral care prior to performing the swallow screen.

___ Patient NPO Refer to SLP if appropriate

___ No attempt to swallow
   ___ Water leaks out of mouth
   ___ Coughing
   ___ Choking/Gagging
   ___ Wet gurgly voice
   ___ O₂ sat drop >2%
   ___ Eye watering (silent aspiration)
   ___ Change in lung sounds/ Change in breathing
   ___ Reddening of face/
   ___ Grinacing
   ___ Any other reason you feel unsafe.

___ Patient NPO Refer to SLP

Is patient alert enough to be assessed?
Is patient managing oral secretions?
(Aide to clear airway, no wet voice, no wet breathing)

YES

Give 1 teaspoon water

Adequate swallow

Give 2nd teaspoon water

Adequate swallow

Give half glass of water
(4 oz/15 cc)
Ask patient to "drink naturally"

Adequate swallow

Order "Mechanical Soft and Thin Liquid" diet for patients with adequate dentition.
Order "Puree and Thin Liquid" diet for patients with poor dentition.
At first meal check for pocketing, difficulty chewing, and fatigue. Refer to SLP if difficulties are noted.
If no problems, advance diet as tolerated.

RN/MD Name: __________________________ Date: __________ Time: __________
In-patient Considerations

- **Nursing Issues**
  - **Started on stroke prevention medications (antithrombotic within 48 hr)?**
  - **Clinical pathway followed?**
  - **Blood pressure within appropriate parameters (Mean 100)**
  - **Know signs of suspected Intracranial Hemorrhage and actions to take (change in LOC?)**
  - **DVT prophylaxis addressed by day 2? Compression Devices/Lovenox/heparin SQ per orders**
  - **Therapies seeing patient? Review PT/OT/ST recommendations**
Inpatient Cont...

- IV fluids (Normal Saline or LR)?
- Nutrition? Dietary evaluation. Assistive devices for feeding. SWALLOW SCREEN DONE?
- Fever? Treat if greater than 99 F with Tylenol
- Blood glucose within appropriate parameters? Obtain sliding scale if necessary.
- Positioning? Pillows under affected limbs. Turn Q2hours. Accommodate limitations
- Rehab consults as soon as possible, if needed
Hemorrhagic Stroke Treatment

- Do not give antithrombotics or anticoagulants
- Monitor and treat blood pressure greater than 150/105 (Table 6, 2005 Guidelines update)
- NPO, until swallow eval is completed
- Anticipate Neurosurgical consult
- Possible administration of blood products
The ideal stroke system interface

- Stroke-ready Dispatch and EMS personnel
- Clear routing to stroke-ready hospitals
- Stroke-ready ED’s/hospitals/transfer systems
- Responsive ED/stroke care team
- Interdisciplinary, regional or state-wide team to develop all of the above
Small rural hospital SE Oregon...
Scenario #2... future

- Providers will be educated on diagnosis and stroke options
- Will call experts for advise ASAP
- May treat with tPA at rural hospital
- Patient will be rapidly transferred to appropriate Primary / Comprehensive Stroke Center for treatment and/or further care.
- Inpatient protocols to guide best care
Building the Oregon Stroke System of Care: Connecting Rural and Urban Populations to Improve Outcomes

Third Annual Meeting of the Oregon Stroke Network
In Collaboration with Oregon EMS & Trauma Systems Program
October 23, 2009
Riverhouse Resort, Bend, OR

Information will be posted on the Office of Rural Health website
Resources

Providence Stroke Center,  www.providence.org/stroke
   suzanne.fisher@providence.org  503-216-1011

Montana Stroke Network,  www.montanastroke.org  (rural protocols/templates)

2008 Hospital Survey conducted by Heart Disease and Stroke Prevention Program
   with the Hospital association:


2007 EMS survey conducted by the Heart Disease and Stroke Prevention Program
   and the AHA/ASA

Heart Disease and Stroke Prevention Program data and data related reports are at:
Oregon State Stroke System of Care

(Recommendations for the American Stroke Association’s Establishment of Stroke Systems of Care can be found at http://stroke.ahajournals.org/cgi/content/full/36/3/690)

opportunities for your hospitals to get involved with

1. Oregon Stroke Network:
   • Steering Committee,
   • Symposium Planning Committee
   • Delivery of Care- EMS Subcommittee
   • Data/Quality Improvement/ Surveillance Subcommittee: TBD


3. Annual OR Stroke Symposium in October, Bend 2009
4. Get With The Guidelines: Stroke
5. Stroke Camp for Families living with Aphasia
6. Telemedicine/ Telehealth: Oregon Health Network (in development)