Pre-Hospital Stroke Care: Bringing It To The Street

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Bedford Regional Medical Center
Overview/Objectives

- Explain the reasons or rational behind the importance of pre-hospital stroke identification.
- Review the current system of EMS in Indiana.
- Review proposed Stroke: Pre-Hospital Protocol.
STROKE FACTS
Statistics

- 795,000 people experience a stroke each year
- 1/3 die, 1/3 become disabled, 1/3 recover
- 610,000 are first attacks
- In the United States, 1 stroke every 40 seconds
- 55,000 more women than men have a stroke
- Number one cause of disability

Heart Disease and Stroke Statistics – 2009 Update AHA
Stroke: Is not an “Accident”

- CVA (cerebrovascular accident) is a bad term:
  - Stroke is preventable and treatable

- Health care personnel need to attach a sense of urgency to stroke i.e. Brain Attack
Risk Factors

Nonmodifiable

- Advanced age
- Male gender
- Race
- Family history of MI or early stroke
Risk Factors

Modifiable

- Hypertension (systolic and diastolic)
- Diabetes
- Hypercholesterolemia
- Cigarette smoking
- Prior stroke/TIA
- Heart disease, carotid disease
- Hypercoagulable states
- Drug use (cocaine)
Stroke Definition and Types

- Sudden brain dysfunction due to a blood vessel problem
- 87% are ischemic, 10% are intracerebral, and 3% are subarachnoid
Ischemic Stroke

Most common cause: thromboembolism

A blood clot forms in the vascular system, travels up, and plugs a cerebral artery
Intracerebral Hemorrhage

Most common cause:
chronic hypertension

Other causes:
- Vessel malformation
- Tumor
- Bleeding abnormalities
Subarachnoid Hemorrhage

Most common cause:
aneurysm rupture

Other causes:

- Vessel malformation
- Tumor
- Bleeding abnormalities
Transient Ischemic Attack (TIA)

- Ischemic stroke that completely resolves.
  - “Angina” of the brain
  - Most common cause: thromboembolism
  - Secondary prevention depends on source of the clot
TIA (continued)

Among TIA patients who go to the ED:

- 5% have a stroke within 2 days
- 10% have a stroke within 3 months
- 25% have a recurrent “event” within 3 months

*JAMA 2000;284:2901*
Save the Penumbra

**Penumbra** is a zone of reversible ischemia around core of irreversible infarction – salvageable in a few hours after ischemic stroke onset.
Major Stroke Syndromes

1. Left Hemisphere
2. Right Hemisphere
3. Brainstem
4. Cerebellum
5. Hemorrhage
Time IS Brain
Time IS Brain
Pre-hospital Care

&

Protocols
Stroke: Signs & Symptoms

- Paralysis on one side
- Facial Droop
- Limb Weakness
- Paresthesias/Sensory loss
  (numbness or tingling)
- Ataxia
  - Gait Disturbance
  - Uncoordinated fine motor movements
Stroke: Signs & Symptoms

- Speech Disturbance
- Vision Problems
- Headache
- Confusion/Agitation
- Dizziness/Vertigo
Speech Disturbance

- **Aphasia**
  - Inability to speak

- **Dysphasia**
  - Difficulty speaking

- **Dysarthria**
  - Impairment of the tongue muscles essential to speech
Vision Problems

- **Nystagmus**
  - Involuntary jerking of the eyes
- **Diplopia**
  - Double vision
- **Monocular blindness**
  - Blindness in one eye
Conditions that mimic Stroke

- Hypoglycemia
- Electrolyte imbalances (esp. Sodium)
- Epidural or subdural hematoma
- Brain abscess or tumor
- Post-seizure
- Migraine
Pre-Hospital Role

- First contact
- Dispatch
- Phone Instruction
- EMS
- Difficulties
Dispatch responsibilities:

1. Recognize the seriousness of strokes
2. Properly question callers
3. Send closest ambulance
4. Determine patient’s medical history and time of onset of stroke symptoms; relay information to responding crew and ED (if applicable)
5. Obtain feedback
Pre-hospital Checklist

- **Dates & Times**
  Date/EMS Times/ED Arrival Time

- **Basic Data**
  PT & Witness info/CC/Last time seen w/o symptoms/vital signs/BG

- **History**
  Headache/head trauma

- **Examination**
  SAH? (AVPU, Neck stiffness) / CPSS (speech, droop, drift)

- **Stroke Alert Criteria**
  Onset time / Exam Abnl/ Not Head Trauma/ BG/Destination Hospital / Contact Hospital
Emergency Stroke Care

- Myth: It makes no difference
- Truth: It does
  1. Better field management of stroke
  2. Decreases time to ED management
- Issue: Pre-hospital and hospital personnel must be on the same page
- Solution: Lead the way.
Indiana Stroke Prevention
Task Force
2006-2007 Assessment

- Received approximately 30%
- Represents 55% of our 92 counties
- Represents 42% of the runs reported in Indiana in 2007
- New Stroke onset accounts for 4.2%
Concerns

- Emergent Responses – Yes 96% No 3%
- Are Dispatchers trained to identify stroke symptoms by phone? Yes 51% No 39%
  Unknown 3%
- Timeliness of hospital notification/protocol
  Yes 51% No 46%
- Use of some form of thrombolytic checklist in the field Yes 24% No 77%
The Question
What is needed to improve stroke care?

- Public Education
- Good Training Resources
- More access to specialty care
- Identification of area hospitals as Stroke Centers
- EMS Commission approved and/or standard protocols
2008 Legislation

(2) Develop a standardized stroke template checklist for emergency medical services protocols to be used statewide

(3) Develop a thrombolytic checklist for emergency medical services personnel to use
Indiana EMS

- Reviewed protocols
- 5 EMS levels of certification
- Medical Directors
- EMS Commission
Treatment Guidelines

**First Responder**

1. **Provide routine medical care**
2. **Provide oxygen**
3. **Support ABCs as needed**
4. **Perform Cincinnati Stroke Scale**
5. **Obtain time of onset or time last known well**
6. **Obtain cell phone # from witness and/or relative/POA**
Treatment Guidelines

**EMT-Basic**
- All the above
- Do not delay transport
- Transport witness or relative/POA with patient, if possible
- Enroute – maintain oxygen saturation at $\geq 93\%$
- Contact receiving facility as soon as possible of possible stroke patient transport
Treatment Guidelines

EMT-Basic Advanced

1. All the above
2. Enroute – initiate IV (do not delay transport)
3. Obtain EKG
4. Enroute – obtain blood glucose level
Treatment Guidelines

EMT-Intermediate

1. All the above

2. Enroute – consider treatment of hypoglycemia if glucose $\leq 60\text{mg/dl}$
Treatment Guidelines

EMT-Paramedic

1. All the above
2. Enroute - Consider 12 LEAD EKG (do not delay transport)
3. Do not treat hypertension
4. Contact Medical Control for additional orders as needed
Suspected Stroke/CVA/TIA

Signs & Symptoms may include: altered mental status, impaired speech (aphasia or dysarthria), confusion, agitation, uncoordinated movement or gait disturbance, severe headache, one-sided weakness (hemiparesis), one-sided paralysis (hemiplegia), high blood pressure (hypertension), lethargy, stupor, coma, seizures, vision disturbances, unevenly dilated pupils.

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**STROKE “BRAIN ATTACK”**

**Initial Assessment**
Routine Patient Care
Assess and Maintain Airway, Breathing, and Circulation

Administer oxygen:
as needed to treat shortness of breath
or
to maintain oxygen saturation of ≥ 93%

*Perform Cincinnati Stroke Scale.*
Obtain Information on the following:
- Time patient last seen normal/onset of symptoms
- Any noted seizure activity
- Past medical history

Advanced/ALS Providers:
Initiate IV of normal saline
Obtain blood sample, if possible
Check blood glucose (Consider treatment if < 60 mg/dl)
Monitor patient’s heart rhythm (Consider 12 LEAD)

Monitor patient’s condition
Position to protect any deficits
Initiate prompt transport
Contact receiving facility as soon as possible (once stroke is confirmed)
Transport with caregiver or obtain contact (cell) number, if possible

**THE CINCINNATI STROKE SCALE**

**FACIAL DROOP** (Patient shows teeth or smiles)
Normal: Both sides of face move equally
Abnormal: One side of face does not move as well as the other

**ARM DRIFT** (Patient closes eyes and extend both arms straight out for 15 seconds.)
Normal: There is no drift at all or both arms drift the same
Abnormal: One arm drifts/moves down compared to the other arm or one arm noticeably weaker than the other.

**SPEECH** (Score first attempt: Patient repeats, e.g. "You can't teach an old dog new tricks.")
Normal: The patient says the correct words with no slurring of words on first attempt.
Abnormal: The patient slurs words, says the wrong words or is unable to speak on first attempt

**Thrombolytic Contraindications**
- History of Stroke or TIA
- Active internal bleeding
- History of bleeding disorder
- Uncontrolled hypertension
- Intracranial/Spinal surgery
- History of aneurysm
- History of trauma or surgery in last 2 weeks
- Pregnancy
- Previous thrombolytic use
- Anticoagulant use

**TRANSPORT SAFELY**
REASSURE and SUPPORT ENROUTE
# Suspected Stroke/CVA/TIA

<table>
<thead>
<tr>
<th>History</th>
<th>Signs and Symptoms</th>
<th>Differential Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous CVA, TIA</td>
<td>Altered Mental Status</td>
<td>Altered Mental Status</td>
</tr>
<tr>
<td>Previous cardiac/vascular surgery</td>
<td>Weakness / Paralysis</td>
<td>TIA</td>
</tr>
<tr>
<td>Associated Diseases:</td>
<td>Vision disturbances</td>
<td>Seizure</td>
</tr>
<tr>
<td>diabetes, hypertension, CAD</td>
<td>Impaired speech (aphasia or dysarthria)</td>
<td>Hypoglycemia</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>Syncope</td>
<td>Stroke</td>
</tr>
<tr>
<td>Medications (blood thinners)</td>
<td>Vertigo / Dizziness</td>
<td>Tumor</td>
</tr>
<tr>
<td>History of trauma</td>
<td>Vomiting</td>
<td>Trauma</td>
</tr>
<tr>
<td></td>
<td>Headache</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seizures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Respiratory pattern change</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hypertension / Hypotension</td>
<td></td>
</tr>
</tbody>
</table>

## Procedures:

1. **Initial Assessment.**
   - Level of consciousness
   - Vitals (blood pressure, pulse, respirations)
   - Assess and maintain airway, breathing, and circulation

2. Provide oxygen as clinically indicated (maintain oxygen saturation ≥ 93%).

3. Cardiac Monitor, treat rhythm as clinically indicated.

4. Perform Cincinnati Stroke Scale (CSS).

5. If CSS positive for stroke, limit scene time to 10 minutes and notify receiving facility as soon as possible.

6. Initiate IV enroute per protocol.

7. Check blood glucose enroute and consider treatment if ≤ 60 mg/dl with Glucagon if no IV or 50 % Dextrose.

8. Perform 12 LEAD EKG enroute.

9. **TIME IS CRITICAL - Do not delay transport.**

10. Notify receiving facility or Medical Control of any changes.

## Critical:

- Special attention should be given to determining the time of onset of symptoms or establishing when patient was last seen normal.
- Transport with caregiver or obtain contact (cell) number, if possible.
- Stroke treatment is time dependent – any possible stroke patient should be transported to the closest appropriate facility as soon as possible.
- Elevating the head of cot 15 to 30 degrees may facilitate venous drainage and help reduce ICP.
Emergency Medical Services
THROMBOLYTIC ELIGIBILITY CHECKLIST
STROKE

Patient Name: ___________________________       Date: ____________

Time Signs & Symptoms began: ________________________________________________

If < 3 hours, continue:

<table>
<thead>
<tr>
<th>Condition</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic BP &gt; 180 mm Hg.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Diastolic BP &lt; 110 mm Hg.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Active internal bleeding or small bleeding disorder?</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>History of CVA or CNS disease?</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Known/suspected pregnancy, recent OB delivery?</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Age &gt; 75?</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Receiving anticoagulants – e.g., Coumadin, Plavix, Lovenox?</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Surgery or significant trauma in past 2 weeks?</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

If the answers to all of these are all no, the patient may be a candidate for thrombolytic therapy and transfer should be expedited to the ED. Inform the ED staff as soon as practical. This completed form is to be delivered to the ED staff upon arrival.

Time of EMS arrival on scene: ___________________________

Signature: ___________________________
Quick Guideline Review

Emergency Medical System
a) Recognition
1) Dispatch
(a) Should be able to recognize suspicious complaints as possible stroke symptoms
• Confusion
• Weakness
• Falling
• Dizziness
(b) Should communicate possibility of stroke to emergency personnel in field
Quick Guideline Review

2) On-site
(a) Cincinnati pre-hospital stroke scale
   • Language
   • Facial weakness
   • Arm weakness (drift)
(b) Awareness of other conditions similar to stroke
   • Seizure
   • Hypoglycemia
   • Hyperventilation

b) Management
Quick Guideline Review

1) On-site
   (a) Check vital signs
   (b) Intervene with any life threatening conditions
   (c) Consider oxygen administration if oxygen saturation is less than the 93%
   (d) Obtain History
       • Time of onset
       • Type of onset: gradual vs. abrupt
       • Onset while awake or asleep
       • Duration of symptoms
       • Nature of symptoms
Quick Guideline Review

2) Transport
   (a) As soon as possible
   (b) Start intravenous access
   (c) Nothing by mouth
   (d) Contact ER destination and notify nature of problem and estimated time of arrival
   (e) Check blood sugar by finger stick
   (f) Place patient on cardiac monitor
Quick Guideline Review

3) Transfer to ER care
   (a) Provide clinical information
      • Time of symptom onset
      • Symptoms
      • Findings of examination
   (b) Provide medication list
Questions

Indiana Stroke Prevention Task Force

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