ND Emergency Medical Services Role in Large Vessel Occlusion Assessment and Establishing a Transport Plan

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Objectives

• Overview of Stroke Basics
• Discuss FAST-ED assessment of stroke
• Discuss the Role of EMS in stroke care
• Discuss how EMS Transport Plans can improve stroke care
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Stroke Types

• Hemorrhagic
• Ischemic
• CT scan is needed for differentiation
Hemorrhagic Stroke

- About 17% of strokes
- Intracerebral Hemorrhage (intraparenchymal Hemorrhage)
  - Hypertension is the most common cause
- Subarachnoid Hemorrhage
  - Aneurysm is the most common cause
- Treatment at a facility with neurosurgical capability
Ischemic Stroke

• 83% of all strokes
• Two types
  – Embolic Ischemic Stroke
  – Thrombotic Ischemic Stroke
Ischemic Stroke

- 83% of all strokes
- Embolic Ischemic Stroke
  - Emboli can be fat globules, air bubbles, bits and pieces of atherosclerotic plaque, or clot
  - 40% of ischemic strokes are embolic and 80% of the emboli come from the heart
Ischemic Stroke

- 83% of all strokes
- Thrombotic Ischemic Stroke
  - 60% of Ischemic Strokes
  - Two types
    - Large vessel thrombosis
      - 70% of Thrombotic events
    - Small vessel thrombosis
      - Seen as lacunar infarction on CT or MRI
Ischemic Stroke treatment

• Per Minute of Ischemia
  – 1.9 million neurons lost
  – 14 billion synapses lost
  – 7.5 Miles of myelinated white matter lost

• tPA was FDA approved in 1996
  – Pt must receive drug within 3 hours of stroke onset expanded off label to 4.5 hours in select patients.
  – For every 100 patients who receive IV tPA
    • 32 will benefit and 3 will be harmed

• Mechanical thrombectomy for patients with large vessel occlusion within 6 hours of onset longer in select cases
EMS Role

- Early Evaluation
- Early Activation
- Proper Destination
<table>
<thead>
<tr>
<th>Cincinnati Prehospital Stroke Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Face</strong></td>
</tr>
<tr>
<td>Both sides move normally</td>
</tr>
<tr>
<td>One side is weak or is flaccid</td>
</tr>
<tr>
<td><strong>Arm</strong></td>
</tr>
<tr>
<td>Both arms have equal normal strength</td>
</tr>
<tr>
<td>One arm is weak or doesn’t move at all</td>
</tr>
<tr>
<td><strong>Speech</strong></td>
</tr>
<tr>
<td>Speech is normal and appropriate</td>
</tr>
<tr>
<td>Speech is slurred, inappropriate words or mute</td>
</tr>
</tbody>
</table>
Suspected Stroke Algorithm Steps

Step 1
Identify signs of a possible stroke.

- Facial Droop (have patient show teeth or smile)
- Arm Drift (patient closes eyes and extends both arms straight out, with palms up for 10 seconds)
- Abnormal Speech (have the patient say "you can't teach an old dog new tricks")

If any 1 of these 3 signs is abnormal, the probability of a stroke is 72%

Step 2
Activate a stroke alert at destination hospital per protocol and call for intercept if appropriate.

Step 3
Complete the following assessments and actions.

<table>
<thead>
<tr>
<th>Assessments</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define and recognize the signs of stroke.</td>
<td>Support the ABC's (airway, breathing, and circulation).</td>
</tr>
<tr>
<td>Establish last known normal time, Assess neurological status while the patient is being transported</td>
<td>Last Known Normal Time: set the time when the patient was last known to be neurologically normal. Note Neurological deficits.</td>
</tr>
<tr>
<td>Obtain Vital signs including blood glucose levels.</td>
<td>Oxygen to maintain &gt;94%</td>
</tr>
<tr>
<td></td>
<td>Obtain IV access</td>
</tr>
<tr>
<td></td>
<td>Treat per protocol and contact OLMD.</td>
</tr>
</tbody>
</table>
Table 1. The FAST-ED Scale and Its Correspondence to the NIHSS

<table>
<thead>
<tr>
<th>Item</th>
<th>FAST-ED Score</th>
<th>NIHSS Score Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial palsy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal or minor paralysis</td>
<td>0</td>
<td>0–1</td>
</tr>
<tr>
<td>Partial or complete paralysis</td>
<td>1</td>
<td>2–3</td>
</tr>
<tr>
<td>Arm weakness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No drift</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Drift or some effort against gravity</td>
<td>1</td>
<td>1–2</td>
</tr>
<tr>
<td>No effort against gravity or no movement</td>
<td>2</td>
<td>3–4</td>
</tr>
<tr>
<td>Speech changes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mild to moderate</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Severe, global aphasia, or mute</td>
<td>2</td>
<td>2–3</td>
</tr>
<tr>
<td>Eye deviation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Partial</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Forced deviation</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Denial/Neglect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Extinction to bilateral simultaneous stimulation in only 1 sensory modality</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Does not recognize own hand or orients only to one side of the body</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

FAST-ED indicates Field Assessment Stroke Triage for Emergency Destination; and NIHSS, National Institutes of Health Stroke Scale.
FAST-ED score coloration to percentage of LVOS

Hosmer and Lemeshow test: 0.62
EMS transport plans

• Prior to 2016 required for Trauma only
  – Many only indicated they transported to the closest facility
• Requirement for Licensing starting in 2016
  – Listing of resources
  – General transport plan
  – Trauma transport plan
  – STEMI transport plan
  – Stroke transport plan
Transport Plans

Name of Service: [Blank]  City: [Blank]
Service Level: BLS  ALS  BLS w/ ALS capabilities

Resources
ALS Ground Intercepts  ALS Air Intercepts
Trauma CAH(s)  Trauma Level  Regional Trauma Center(s)
Stroke Ready Hospital(s)  Primary Stroke Center(s)
Cardiac Capable Hospital(s)  PCI Center(s)
CAH(s)  Tertiary Center(s)

On-Line Medical Control

Medical Director Signature: ___________________________  Date: ___________________________

For DEMST Use Only:

Approved By: ___________________________  Approved Date: ___________________________
General Transport Guidelines

**Intercept Considerations (Ground and Rotor Wing)**
- ALS intercept is required by BLS ambulance services for patients exhibiting traumatic injuries that meet trauma code activation criteria, cardiac chest pain or acute myocardial infarction, cardiac arrest, stroke symptoms, severe respiratory distress, or respiratory arrest.
- ALS intercept should be considered by BLS ambulance services for pain control and any other medical condition the EMT feels warrants an intercept.

**Destination Determination Considerations**
- Transport medical patients to the nearest hospital. You may bypass a hospital to transport to another hospital that is more capable in treating the patient’s condition with concurrence of medical control or with a physician’s order.
- Patients with life threatening conditions or symptoms (i.e. airway obstruction, cardiac arrest, anaphylaxis, etc.) should be transported directly to the nearest hospital.
- When the difference in estimated transport times to more than one hospital is less than ten minutes, the hospitals may be presumed to be of equal transport distance.
- If a patient’s condition is stable and he/she is requesting transport to a hospital that is farther away, the ambulance may honor that request under the following conditions:
  - Medical control/direction has concurred
  - Additional transport time will not adversely affect the patient’s condition
  - The patient has been advised and understands that insurance may not cover the additional expense of a longer transport
  - Weather and road conditions are acceptable
  - The additional transport time will not place the service area uncovered for an unreasonable amount of time
Stroke

**Intercept Considerations (Ground and Rotor Wing)**
- ALS intercept is required by BLS ambulance services for patients exhibiting stroke symptoms. Ambulance services must activate a Stroke alert for patients who meet stroke activation criteria.

**Destination Determination Considerations**
- A patient suffering a suspected stroke must be transported to a designated acute stroke ready hospital, primary stroke center, or a comprehensive stroke center. This may result in bypassing a closer licensed health care facility for another located farther away.

Ambulance services must include a copy of the criteria utilized to activate/call a Stroke alert.
Stroke

Intercept Considerations (Ground and Rotor Wing)
- ALS intercept is required by BLS ambulance services for patients exhibiting stroke symptoms. Ambulance services must activate a Stroke alert for patients who meet stroke activation criteria.

Site Specific for Divide County Ambulance District

ALS Crew - See AR LLC Protocols V15.5 section 1.4-5
BLS Crew - See BLS guidelines for ALS/Helicopter Intercept

Zone 1 - If Divide Co ALS crew becomes available and its practical request intercept with Divide Co ALS crew or Williston Fire Department while enroute to destination hospital. Consider activating Rotor Wing service to rendezvous at destination hospital, enroute to hospital, or on scene and notify OLMD at destination hospital of Rotor Wing activation.

Zone 2 - If Divide Co ALS crew becomes available and its practical request intercept with Divide Co ALS crew while enroute to destination hospital. Consider activating Rotor Wing service to rendezvous at destination hospital, enroute to hospital, or on scene and notify OLMD at destination hospital of Rotor Wing activation.

Destination Determination Considerations
- A patient suffering a suspected stroke must be transported to a designated acute stroke ready hospital, primary stroke center, or a comprehensive stroke center. This may result in bypassing a closer licensed health care facility for another located farther away.

Site Specific for Divide County Ambulance District
ALS and BLS Crews

Zone 1 -
Within 3 hour window of last known normal time including transport time. Transport to CHI St Alexius (Williston) unless the Paramedic/EMT determines that the patient requires additional stabilization and would best be served being transported to the closest available hospital, if this should happen consult OLMD at the destination hospital to activate ALS ground or air transport. BLS Crew is required to call for ALS intercept if available.

Between 3-6 hour window of last known normal time including transport time. Arrange air medical transport to Trinity Medical Center if available and transport to the closest facility or intercept directly with Rotor Wing service.

Zone 2 -
Within 3 hour window of last known normal time including transport time. Transport to Tioga Medical Center unless the Paramedic/EMT determines that the patient requires additional stabilization and would best be served being transported to the closest available hospital, if this should happen consult OLMD at the destination hospital to activate ALS ground or air transport. BLS Crew is required to call for ALS intercept if available.

Between 3-6 hour window of last known normal time including transport time. Arrange air medical transport to Trinity Medical Center if available and transport to the closest facility or intercept directly with Rotor Wing service.

Ambulance services must include a copy of the criteria utilized to activate / call a Stroke alert.
70 Year Old Male Acute Stroke

- 11:40 Approximate onset
- 10:54 EMS Dispatch
- 10:59 Arrived on Scene
- 11:01 Patient Contact
- 11:11 Departed scene
- 11:16 Arrived in ETC
70 Year Old Male Acute Stroke

• 11:16 Arrived in ETC
  – Evaluated on ambulance cart in the hall then direct to CT. FAST-ED of 5
• 11:31 CT scan complete
• 11:33 CT read complete by radiologist and reported to ETC physician
  – Evaluation completed
  – contraindications reviewed Indications
  – risks and benefits reviewed with patient
• 11:48 TPA Bolus administered
• 11:51 Infusion Started
• 12:25 MRA with Diffusion Completed
During this presentation 67 Strokes have occurred in the United States.