Speaker Disclosure Information

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EMS and ED Collaborative Efforts for Improved Patient Outcomes

Financial Disclosure:
No relevant financial relationship exists

Objectives

• Identify opportunities to improve collaboration between EMS and the ED to improve stroke patient outcomes
• Discuss opportunities for EMS responders to better align training in preparation for stroke patients
• Discuss methods to work collaboratively with EMS responders to ensure patients symptomatic of stroke are triaged, rapidly assessed, treated and transported
• Discuss how to provide opportunities for EMS responders to participate in training regarding stroke assessment and care
• Outline LMC stroke protocol and recent outcome data

2011 SC Legislation:
Stroke Systems of Care Act

- Legislatively mandated
- Managed under SCDHEC
- 18 experts involved in stroke care
- Met from Oct 2009 until Nov 2010

Stroke Systems of Care Study Committee

- Identifies Primary Stroke Hospitals
- Requires EMS to transport stroke patients to nearest stroke capable facility
- Allows use of tele-medicine
- Establishes pre-hospital protocols
- Establishes a Stroke Advisory Council
- Establishes a Stroke Registry Task Force

Addresses Barriers to Optimal Treatment

ASA/AHA Guidelines

• The use of written care protocols is a Class I, Level A recommendation
• Inclusion of EMS in a PSC is a Class I, level A recommendation
• Transport to the nearest PSC that can provide appropriate care unless another life-threatening emergency is present is a Class I, Level B recommendation
Prehospital Management

• EMS serves as initial medical care provided to potential stroke patients based on recent research data
• Patients using EMS services are more likely to present for stroke treatment within three hour window
• Patient transport times are shorter when EMS is activated

Chain of Response

• Public recognition through education
• 911 personnel
• EMS
• Emergency Department
• Stroke Specialist

EMS Involvement

• Increases need for effective communication
• Recognition of this integral early role highlights the importance for collaboration

EMS and ED Stroke Assessment

Several stroke assessment scales available
Los Angeles and Cincinnati Prehospital Stroke Scales
Validated and currently recommended by ASA/AHA

Los Angeles Stroke Scale

Patient history obtained
Physical findings identified
Finger stick glucose measured

Uses patient history, physical findings and rapid assessment for hypoglycemia
Additional examination points allow for increased time for completion
Los Angeles Stroke Scale

Cincinnati Stroke Scale

- Less data collection needed for completion
- Less time between recognition of potential stroke and transport
- Assessment of facial droop
- Identification of arm drift
- Clarity of speech evaluated

Cincinnati Stroke Scale

- **Facial droop:**
  - The 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:**
  - The patient closes their eyes and extends both arms straight out for 10 seconds
  - **Normal:** Both arms move the same, or both arms do not move at all
  - **Abnormal:** One arm either does not move, or one arm drifts down compared to the other

- **Speech:**
  - The patient repeats “The Sky is blue in Cincinnati”
  - **Normal:** The patient says correct words with no slurring of words
  - **Abnormal:** The patient slurs words, says the wrong words, or is unable to speak

History Components

- Onset of symptoms
- Recent events
- Stroke
- Myocardial infarction
- Trauma
- Surgery
- Bleeding
- Comorbid diseases
- Hypertension
- Diabetes mellitus
- Use of medications
- Anticoagulants
- Insulin
- Antihypertensives
**Lexington EMS Protocol**

The Cincinnati Stroke Scale has been chosen to evaluate potential stroke patients

- Requires 30-60 seconds to complete
- Transport time potentially minimized allowing more time to meet end point goals

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**General Goals for EMS**

- Timely recognition of acute stroke symptoms
- Stabilization of patient during transport
- Rapid notification of intended ED for transport and estimated transport time
- Safe and rapid transport to most appropriate facility for treatment
- Response and transport times should be tailored to regional resources and infrastructure

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**Lexington County EMS Stroke Protocol**

1. Cincinnati Stroke Scale
2. Oxygen
   - Maintain an O₂ saturation ≥95%
3. 12 Lead EKG
4. IV (20g or larger/AC is preferred
5. Blood glucose level
6. Whenever possible a detailed history to include recent major surgery, past CVA, head trauma, GI bleed, and MI should be obtained.
   Preferred IV access is a 20g in the AC or higher. Use caution treating hypoglycemia in patients presenting with signs of intracranial hemorrhage. Additionally patients with suspected intracranial hemorrhage should be transported with their head elevated at least 30 degrees.

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**Management Guidelines**

**TABLE 3. Guidelines for EMS Management of Patients With Suspected Stroke**

- Manage ABC’s
- Cardiac Monitoring and ECG transmission
- IV placement
- Oxygen administration and pulse ox placement
- FSBs assessment
- Maintain NPO status
- ED notification
- Rapid transport to closest appropriate facility
Collaboration with EMS

Met with EMS Clinical Educator - Primary Stroke Certification, Protocols, and Outcomes
Medical Control Officer Stroke Committee Ad Hoc Member
EMS’s Stroke Protocol Shared with LMC

Stroke Pre-Notification and "Stroke Alert" Data Shared
Educational Offerings Provided

Lexington Medical Center Stroke Protocol

PURPOSE: To provide acute stroke care based on best practice guidelines.

Pre-hospital Notification:
1. EMS will advise Lexington Medical Center when they are en route with an acute stroke patient, and give estimated time of arrival
2. ED Clinical Coordinator initiates the Acute Stroke Team (AST) for “Stroke Alert” when patient symptom of onset (time last known well or symptom free) is less than 6 hours
3. Clinical Coordinator notifies CT tech that “Stroke Alert” en route and their ETA.

Patient Presentation to Triage:
1. Primary Triage RN completes initial assessment
2. “Stroke Alert” identified when patient symptom of onset (time last known well or symptom free) is less than 6 hours
3. Clinical Coordinator notified
4. Activation of Acute Stroke Team for patients that present to the ED

LMC Stroke Outcomes: EMS Pre-notification

[Graph showing LMC Stroke Outcomes]

DNV Primary Stroke Center Analysis

- Community Education
- EMS notification of PSC hospital data including response times, treatments utilized and disposition
- Effective communication between all involved parties to improve response and treatment times
- Collective ongoing education and training to improve assessment and care
Community Education

- Health Fairs – schools, churches or businesses
- LMC website has link to American Stroke Assoc. and National Stroke Assoc.
- Stroke magnets
- Articles in magazines
- Primary Stroke Center Billboards
- Social Clubs/Meetings
- Power Point Presentation: “Let’s Talk About Stroke”
- Physician Lecture Series: “Stroke Signals- Understanding the Signs and Symptoms”

Det Norske Veritas
Primary Stroke Certification Standards

- Certified Primary Stroke Center
- Integrates Requirements of Hospital Accreditation
- American Heart and American Stroke Association
- Guidelines of the Brain Attack Coalition

Det Norske Veritas Primary Stroke Certification Standards

- Collaborate with EMS to Ensure Rapid Assessment and Treatment
- Pre-notification of Patients with Acute Stroke Patients: Allows ED Staff to Alert Acute Stroke Team
- Incorporate Pre-Hospital Data: Data Exchange Between EMS, ED and Stroke Team, Use Data to Evaluate PSC Effectiveness
- PSC Provides Stroke Educational Opportunities for EMS: Offer Training Programs Regarding Stroke Assessment and Care
- LMC Stroke Outcomes: ED Stroke Alert Response Times

Data Source: Outcome Science; Sampling of Charts
LMC Stroke Outcomes: ED Stroke Alert Response Times

- EKG Computed ≤ 60 Min.*
- Labs Completed ≤ 60 Min.
- CXR Completed ≤ 60 min

0% 20% 40% 60% 80% 100%

EKG Competed ≤ 60 Min.*
Labs Completed ≤ 60 Min.
CXR Completed ≤ 60 min

IV rt-PA Arrive in 2 hrs, Treat by 3 hrs**
IV rt-PA Arrive in 3 hrs, Treat by 4.5 hrs (Incl. Treat by 3 Hrs)

LMC Stroke Outcomes: Thrombolytic Administration

- 2011 Benchmark
- 2009
- 2010
- 2011
- 1Q 2012
- 2Q 2012

Venues for EMS Education
- Advance Stroke Life Support Class - 2 Slots Open to EMS
- Share Educational Information Other Sources a) ASA: EM54stroke Module b) Pharmaceutical Companies
- STEMI and Stroke Forum May 2012-AHA Mission
- Lifeline & Midland’s Hospitals
- Collaboration with EMS Educators & Medical Control Officer

Opportunities For Improved Collaboration
- EMS should be aware of capabilities of potential stroke centers
- Transport time and time of onset should be considered with services offered
- ED/Hospital should provide education to EMS
- Advocacy for single stroke screening tool
- Ensure all responders are familiar with chosen scale

Data Source: Outcome Science; Sampling of Charts

Data Source: Outcome Science; 100% Review of tPA Cases
Conclusions

- Integrated treatment and assessment algorithms are essential to establishing appropriate care for stroke victims
- Goals of collaboration should be focused around decreasing morbidity and mortality associated with strokes
- Frequent feedback between EMS, emergency departments and stroke specialist is necessary for improvement at all points of care

References

4. Det Norske Veritas Healthcare, Inc., 2009, *Primary Stroke Center Certification Requirements PSC 1.0*