EMS Stroke Care

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Objectives

- Describe the role of EMS personnel in the identification and initial evaluation of patients with suspected strokes.
Why is EMS an important component of a stroke system?

- EMS is the initial point of contact with the medical system for 40-70% of stroke patients.
- EMS personnel must be able to detect stroke if the rest of the stroke system of care is to be launched in a timely manner.
- EMS protocols often dictate destination.

2013 AHA/ASA Guidelines

- EMS Dispatch
- EMS Assessment & Management

2013 ASA Dispatch #1

- “To facilitate the recognition of stroke and provide adequate prehospital stroke care by EMS, statewide standardization of telecommunications programs, stroke education modules, and care protocols is recommended.”
“The provision of ongoing education to dispatchers will improve their skills in recognizing the signs and symptoms of stroke.”
Dispatch: what actually happens

- Orange County & Durham County, NC
- 104 calls to 9-1-1 for patients with a discharge diagnosis of stroke or TIA

Who made the calls?
- 44 medical personnel
  - 37 ECF, 2 home health, 5 doctor’s offices
- 38 by a family member
- 8 by a bystander or neighbor
- 3 by “other”
- 6 by the patient him / herself

What did the callers report?
- 42 altered mental status
- 33 trouble walking
- 28 impaired speech
- 28 abnormal breathing
- 12 nausea / vomiting
- 8 sweaty / clammy
- 8 chest pain
- 6 headache
How were the calls dispatched?
- 22 (31%) stroke
- 20 (28%) “sick call”
- 8 (11%) breathing difficulty
- 5 (7%) chest pain
- 4 (6%) unconscious
- 3 (4%) fall

Can dispatchers identify stroke?
- Ellison et al 2004 (KCMO): sensitivity 61%, specificity 20%
- Buck 2009 (LA): sensitivity 40%
- Ramanujam 2008 (San Diego): sensitivity 83%, PPV 42%
  - Paramedics: sensitivity 44%, PPV 40% via CPSS

2013 ASA Recommendation #3
- Prehospital care providers should use prehospital stroke assessment tools, such as the Los Angeles Prehospital Stroke Screen or Cincinnati Prehospital Stroke Scale.
  - Class I, LOE B
  - LOE B: Data derived from a single randomized trial or nonrandomized studies
Los Angeles Prehospital Stroke Screen

- Four history items
  - Age > 45
  - No history of seizure/epilepsy
  - Symptoms < 24 hrs
  - Not wheelchair-bound or bedridden
- Blood glucose 60-400 mg/dL

LAPSS

- Three examination items
  - Facial smile / grimace symmetry
  - Grip strength
  - Arm strength / drift
- Published October 1998
  - 93% sensitive when applied by the authors

LAPSS Validation Study: UCLA

- 3 ALS ambulances based at UCLA
- 60-minute training session
- 5-scenario video exam
- 19-item written test
- Implemented for seven months

Kidwell CS et al. Stroke 2000;31:71
LAPSS Validation Study
- 36 stroke patients (21 ischemic, 8 hemorrhagic, 7 TIA)
- Four false-negatives
- One false-positive
- Sensitivity: 91%
- Positive predictive value: 86%

Kidwell CS et al. Stroke 2000;31:71

Cincinnati Prehospital Stroke Scale
- "simplification of the 15-item NIHSS"
  - Facial droop
  - Arm weakness
  - Speech abnormalities
- Created and tested by physicians 1997
CPSS Validation
- Physician and four paramedics scored 171 inpatients, 49 of whom had stroke
- Excellent agreement (r=0.89)
- Any one abnormality: 59% sensitive, 89% specific for stroke


Melbourne Ambulance Stroke Screen (MASS)
- 1. Age >45 years
- 2. No hx of seizure / epilepsy
- 3. Not wheelchair-bound or bedridden
- 4. Blood glucose 50-400 mg/dL

PLUS
- Any one of:
  - Unilateral facial droop
  - Unilateral hand grip weakness
  - Unilateral arm drift
  - Abnormal speech

Prehosp Emerg Care 2005;9:297-302

LAPSS: Sensitive
CPSS: Specific
Melbourne, Australia

- Prospective interventional cohort study
- 3.4 million population
- 10,000 km²
- One-hour training session

Melbourne Study: Results

- Sensitivity in identifying stroke improved from 78% to 94%
  - 97% when MASS used and documented
- Documentation of time of onset improved from 53% to 82%

2013 EMS Management Recommendations
Prenotification: The Barcelona Experience

- “Prehospital Stroke Code” with direct contact between the dispatch center and the hospital attending neurologist
- Increased thrombolysis rate for ischemic stroke from 7% to 27% (p=0.005)
  - Nine eligible patients for whom the “stroke code” was not activated did not receive lytics due to in-hospital delays

2005 ASA Recommendation #3

- Direct involvement of emergency physicians and stroke experts in the development of education materials, communications and field assessment materials, treatment protocols, and transport protocols
- This is where YOU come in!

Summary: What Can You Do?

- Get to know your EMS medical director
- Offer assistance with initial and continuing education for field personnel and dispatchers
- Know your system’s protocols and your state’s requirements/regulations (if any)
- Discuss notification systems (EMS/ED)
- Set up a system of feedback to EMS personnel and dispatchers
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