


Section: **Adult Medical**  
Subject: **STROKE**  
Section #: **340.32**  
Issue Date: **March 21, 2011**  
Revision Date: **December 1, 2017**  
Approved By: 


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1. Clinical Intent
  - a. Inclusion criteria
    - i. Patients who have an acute episode of a focal neurological deficit that can include any combination of the following:
      1. Unilateral paralysis
      2. Focal numbness
      3. Language disturbance (speaking and/or understanding, including slurred speech)
      4. Sudden, severe, unusual headache
      5. Visual disturbance
      6. Monocular blindness
      7. Acute onset vertigo
      8. Acute onset double vision
      9. New onset of poor balance
  - b. Exclusion criteria
    - i. Significant preceding or accompanying head or spine trauma being the proximate cause of the acute neurological emergency
    - ii. Overdose or intoxication (intentional, accidental, or otherwise)
    - iii. Symptomatic hypoglycemia responding to treatment
  - c. Expected Outcome
    - i. All patients who are experiencing an ischemic or hemorrhagic stroke are identified in the pre-hospital setting, stabilized, treated appropriately, and efficiently delivered to a healthcare facility that is best suited to provide the patient with the opportunity for a successful outcome.<sup>1</sup>
2. Diagnostics and Evaluation:
  - a. Ensure that the patient's airway is open, and that breathing and circulation are adequate.
  - b. Obtain and record the patient's initial vital signs, repeat enroute as often as the situation indicates.
  - c. Obtain and document the blood glucose level.
    - i. Avoid the administration of glucose-containing fluids unless the patient is hypoglycemic (less than 60 mg/dL.)
  - d. Gather and document the following information:
    - i. The last date and time that the patient was known to be normal or at their neurologic baseline (Last Known Normal, or LKN). This shall be expressed in hours and minutes, and not simply relative to EMS arrival. (i.e., 11/1/17 at 09:00, and not "30 minutes ago.").
    - ii. The name and all contact information for a witness who can communicate with the destination facility regarding the patient's baseline and acute medical condition
      1. If possible, transport the reliable witness with the patient.
    - iii. Current medications

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<sup>1</sup> "Implementation Strategies for Emergency Medical Services within Stroke Systems of Care: A Policy Statement from the American Heart Association/American Stroke Association Expert Panel on Emergency Medical Services Systems and the Stroke Council." *Stroke* (00392499), vol. 38, no. 11, Nov. 2007, p. 3097.

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- e. Perform a rapid structured stroke assessment using the FAST exam (Cincinnati Stroke Scale):
    - i. Facial movements: Ask the patient to smile or show their teeth. If one side does not move well, document which side is affected.
      - 1. Normal: Both sides of the face appear symmetrical
      - 2. Abnormal: There is a new unequal smile, grimace, or obvious facial asymmetry.
      - 3. Questionable: It is unclear to the examiner if there is a new unequal smile, grimace, or obvious facial asymmetry.
    - ii. Arm movements: Lift the patient's arms up to 90 degrees if they are sitting or 45 degrees if they are supine. Ask them to keep their arms up, and then let go. If one arm drifts or falls, document which side is affected.
      - 1. Normal: Neither arm drifts or falls down.
      - 2. Abnormal: One arm either drifts or falls down.
      - 3. Questionable: It is unclear to the examiner if one arm drifts or falls down.
    - iii. Speech: If the patient attempts to engage in a conversation, look for a new disturbance in speech. Listen for slurred speech or word-finding difficulties. Identify the latter by asking the patient to name commonplace objects that are nearby such as computer, phone, keys, or pen. You can also place an object in the patient's hand and ask them to name it.
      - 1. Normal: There is no evidence for a new abnormality of speech.
      - 2. Abnormal: There appears to be a new abnormality of speech.
      - 3. Questionable: It is unclear to the examiner if there is a new abnormality in speech present.
  - f. If at least one FAST criteria is abnormal call a Stroke Alert.
  - g. Once a potential stroke has been identified, perform an assessment of the severity of the potential stroke using the Simple 3-Item (3-ISS, or a.k.a. LAG) Scale:
    - i. Level of consciousness (Use AVPU scoring)
      - 1. Alert or Verbal only: 0 points
      - 2. Pain only or Unresponsive: 2 points
    - ii. Arm strength
      - 1. Can lift arm and maintain in air for 5 seconds: 0 points
      - 2. Can't lift arm, or can't maintain in air for 5 seconds: 2 points
    - iii. Gaze
      - 1. Patient's eyes can track your finger across the midline: 0 points
      - 2. Patient's eyes can't cross the midline when tracking a finger or object: 2 points
    - iv. A positive LAG Score is four or six points.
  - h. Perform a 12 lead EKG if time permits.
3. Destination determination:
- a. Once the potential for a stroke has been determined to exist and the severity of the neurologic impact has been graded, the patient shall be transported to the closest appropriate stroke center (primary or comprehensive), unless they are experiencing cardiac arrest.
  - b. Stroke patients shall be placed into one of two categories: **complex strokes** and **simple strokes**.
    - i. The following conditions shall define a patient as having a **complex stroke**:

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1. Known pregnancy<sup>2</sup>
2. LAG score  $\geq 4$
3. LKN time > 3.5 hours and < 24 hours.
4. LKN time > 2 hours and < 24 hours if patient is:
  - a. Taking anticoagulants other than aspirin, or
  - b. Has a history of both diabetes and prior CVA.
5. Any "Wake-up Stroke" in which patient went to bed asymptomatic and woke up with stroke symptoms.
6. Patient with a high clinical suspicion of subarachnoid hemorrhage defined as:<sup>3</sup>
  - a. Abrupt onset of severe head pain reaching maximum intensity in <1 minute, **lasting for  $\geq 5$  minutes**, and accompanied by one or more of the following symptoms<sup>4</sup>:
    - i. Age > 40 years
    - ii. Impaired consciousness
    - iii. Neck stiffness
    - iv. Headache occurred immediately after exertion or Valsalva
    - v. Systolic BP > 160 mmHg or diastolic BP > 100 mmHg
    - vi. Nausea or vomiting
  - b. Patients with intravenous thrombolytic exclusions:
    - i. Any of the following within the past 3 months: intracranial or spinal surgery, head trauma, previous stroke
    - ii. Known cerebral aneurysm
- ii. A patient meeting none of the complex stroke criteria, with a positive FAST exam shall be considered to be having a **simple stroke**.
- c. Transport criteria:
  - i. All **complex strokes** shall be transported to the nearest Comprehensive Stroke Center.
  - ii. All **simple strokes** shall be transported to the nearest stroke center - Primary or Comprehensive.
  - iii. Justification for any deviation shall be documented in the ePCR.
  - iv. A list of current hospital capabilities is maintained by the Rescue Division and updated as changes occur.
  - v. The use of an air ambulance may be considered when the benefits of rapid transport outweigh the risks and delays inherent in air-medical care.
    1. Such cases would include situations when the transport time by ground exceeds 45 minutes.

<sup>2</sup> There is 24-hour OB coverage at all Comprehensive Stroke Centers.

<sup>3</sup> Schwedt, Todd J., and David W. Dodick. "Thunderclap headache." Up-to-Date. Ed. Jerry W. Swanson and John F. Dashe. Wolters Kluwer Health, 10 Dec. 2014. Retrieved 22 July 2017. Available from [www.uptodate.com](http://www.uptodate.com).

<sup>4</sup> Ducros, A., et al. "The International Classification of Headache Disorders, (Beta Version)." Cephalalgia 33.9 (2013): 629-808.

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4. Notification

- a. Include the following information in your report to the hospital:
  - i. Identify your unit and clearly state that you are bringing in a Stroke Alert patient
  - ii. Patient's age and sex
  - iii. FAST exam findings
  - iv. Simple 3-Item (LAG) Scale findings
  - v. Elapsed time since the patient was last seen normal (or at their baseline neurologic status). If the information is not available or is unreliable, say "unknown time since last seen normal."
- b. If patient is a WAKE UP STROKE, convey this to the hospital, along with LKN time and time discovered.
- c. Relate if there was a seizure at symptom onset, or since your arrival.

5. Treatments


- a. Position
  - i. Protect any paralyzed or partially paralyzed extremities from undue compression or injury due to malposition.
  - ii. Position of comfort with head of bed slightly elevated or flat, as tolerated
- b. Oxygen
  - i. If oxygen saturation <95%, then apply oxygen at 2 L/min via nasal cannula.
  - ii. If oxygen saturation <92%, then apply respiratory support with BVM as tolerated.
  - iii. Consider intubation if the patient is not able to handle their secretions, or has a level of consciousness diminished to the point that their Glasgow Coma Scale (GCS) is < 8
    1. If necessary, call ALS for intubation.
- c. Blood Pressure Control (Medic-1 consult not required if the patient is a Stroke Alert.)
  - i. Monitor blood pressure every five minutes to establish a trend.
  - ii. If after second blood pressure check the systolic BP remains > 200 mmHg or the diastolic BP remains > 120 mmHg:
    1. **Labetalol** 10 mg IV once.
  - iii. If the systolic BP remains between 180 and 200 mmHg, you may contact Medic-1 for consultation.

6. Documentation

- a. Record all patient care information, including the patient's medical history and all treatment provided, on the electronic Patient Care Report (ePCR). Particular care should be taken to document accurate information as regards to the following:
  - i. Telephone numbers, including cellular telephone numbers, of witnesses or relatives may help the ED to clarify the history or seek consent for treatment.
  - ii. A list of the patient's medications, or the medication containers themselves, should be sought, with particular attention paid to identifying anticoagulant (both oral and injectable), antiplatelet, and antihypertensive medication use.
- b. Complete Stroke Alert form with all exam findings
  - i. Provide the original to the receiving facility
  - ii. Scan a copy into the ePCR.

7. ALS evaluation and transport criteria

- a. All patients with signs and symptoms of stroke, TIA, or other acute neurologic change are ALS.

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8. QA Points

- a. The most important thing that you can do to help a patient who may be having a stroke is correctly identify that the symptoms are present, and get them headed toward a stroke center.
- b. Do not become distracted by the level of blood pressure, avoiding aspiration will help your patient out much more in the long run than lowering blood pressure.