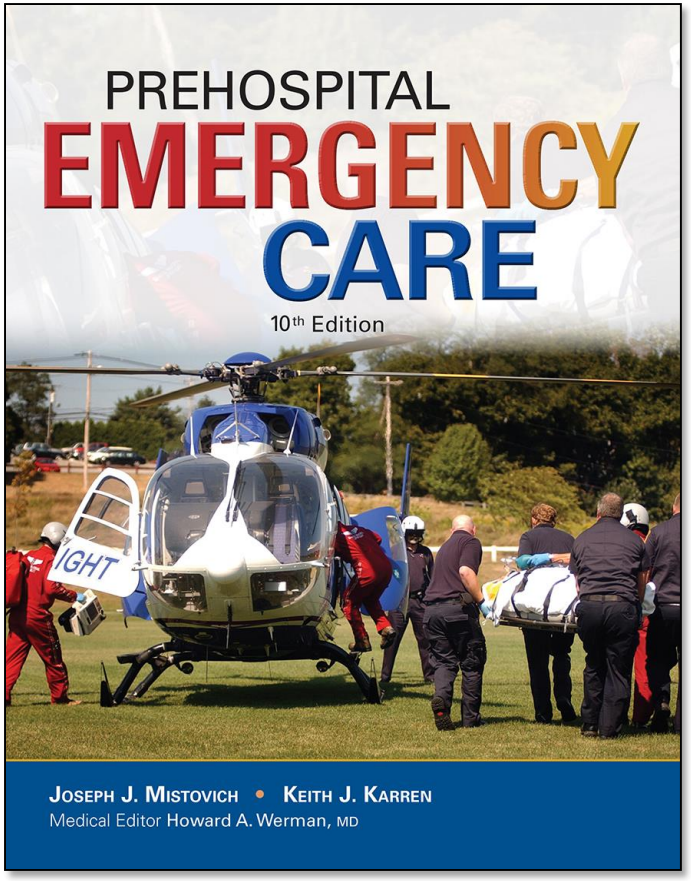
PREHOSPITAL EMERGENCY CARE

TENTH EDITION



CHAPTER 18

Altered Mental Status, Stroke, and Headache

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Learning Readiness

- EMS Education Standards, text p. 524

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Learning Readiness Objectives

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Learning Readiness
Key Terms

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Setting the Stage

- Overview of Lesson Topics
  - Altered mental status
  - Stroke
  - Headache

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Case Study Introduction

"Hurry, he's back here," Mrs. Hewlett calls to EMTs Fred Archuleta and Reese Kemp. "I think he's having a stroke!"

The EMTs find John Hewlett, a 69-year-old male, sitting in a chair, looking anxious. Mr. Hewlett begins to speak, but his speech is slurred, and there is a noticeable droop on the right side of his face.

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Case Study

- What would make the EMTs suspect the patient might be having a stroke?
- What other conditions could explain the patient's presentation?
- How should the EMTs go about determining what the problem is?

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Introduction

- Altered mental status has many causes, and can place the patient's airway at risk.
- Early recognition of stroke is critical for proper care.
- Headache should be considered a serious symptom that could be caused by an underlying condition.

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Altered Mental Status

- Dysfunction of the reticular activating system or cerebral hemispheres interferes with consciousness.
- Altered mental status (AMS) is an indication of significant illness or injury.
- Causes of AMS may be structural or toxic-metabolic.

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Altered Mental Status

- Structural causes of AMS
  - Brain tumor
  - Intracranial hemorrhage
  - Brain hemorrhage
  - Direct brain tissue injury
  - Degenerative disease
  - Brain abscess or infection

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Altered Mental Status

- Toxic-metabolic causes of AMS
  - Hypoxia
  - Abnormal blood glucose level
  - Liver failure
  - Kidney failure
  - Poisoning

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Altered Mental Status

- Other causes of AMS
  - Shock
  - Drugs that depress the CNS
  - Post-seizure state
  - Infection
  - Cardiac rhythm disturbance
  - Stroke

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Altered Mental Status

- Assessment-based approach
  - Scene size-up
    - Causes of AMS can be medical or traumatic.
    - Look for the mechanism of injury or clues to the nature of the illness.
    - Collect the patient's medications.
    - Remove the patient from a hazardous environment.

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Altered Mental Status

- Assessment-based approach
  - Primary assessment
    - Stabilize the spine, if indicated.
    - Assess for airway patency.
    - Assess for breathing adequacy.
    - Assess the need for supplemental oxygen.

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Altered Mental Status

- Assessment-based approach
  - Secondary assessment
    - Baseline vital signs
    - History
    - Physical exam

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Altered Mental Status

- Ask the following:
  - What were the signs and symptoms prior to the altered mental status?
  - Did the signs and symptoms get progressively better or worse?
  - Does the patient have any allergies?

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Altered Mental Status

- Ask the following:
  - What medications is the patient taking?
  - What is the past medical history?
  - When did the patient last have anything to eat or drink?
  - What was the patient doing?

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Altered Mental Status

- Assess the following:
  - Head, for evidence of trauma
  - Pupils
  - Mouth and oral mucosa, for cyanosis or pallor
  - Chest, for indications of trauma
  - Breath sounds

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Altered Mental Status

- Assess the following:
  - Abdomen, for evidence of bleeding
  - Extremities, for motor and sensory function, and pulses
  - Lower extremities, for edema
  - Posterior body, for edema

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Altered Mental Status

- Assess the following:
  - Vital signs
  - Blood glucose level

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Altered Mental Status

- Possible findings in trauma
  - Obvious signs of trauma
  - Abnormal respiratory pattern
  - Increased or decreased heart rate
  - Unequal pupils
  - High or low blood pressure

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Altered Mental Status

- Possible findings in trauma
  - Discoloration around the eyes
  - Discoloration behind the ears
  - Pale, cool, moist skin
  - Abnormal flexion or extension

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Altered Mental Status

- Possible findings in medical emergencies
  - Abnormal respiratory pattern
  - Dry or moist skin
  - Cool or hot skin
  - Pinpoint, midsize, or unequal pupils
  - Stiff neck

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Altered Mental Status

- Possible findings in medical emergencies
  - Lacerations to the tongue (seizure)
  - High systolic blood pressure with low heart rate
  - Loss of bladder or bowel control
  - High or low blood glucose reading

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Altered Mental Status

- Emergency care
  - Spinal stabilization, if indicated
  - Maintain the airway.
  - Suction, as needed.
  - Maintain SpO_2 at or above 94%.
  - Ventilate, if needed.
  - Position the patient.
  - Transport.

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Altered Mental Status

- Reassessment
  - Reassess every 5 minutes.
  - Look for changes in mental status, airway, breathing, and circulation.
  - Record vital signs.

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Stroke

- A deficiency in nervous system function is called a *neurological deficit*.
- A neurological deficit is an indication of a problem affecting the central nervous system.

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Stroke

- Stroke is the third leading cause of death in adults.
- Time is a critical factor in stroke management.
- EMTs can make a significant difference through early recognition and transport of stroke patients.

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Stroke

- Stroke is caused by obstruction of blood flow to an area of the brain.
- Atherosclerosis is a contributing factor.
- Strokes can be ischemic or hemorrhagic.

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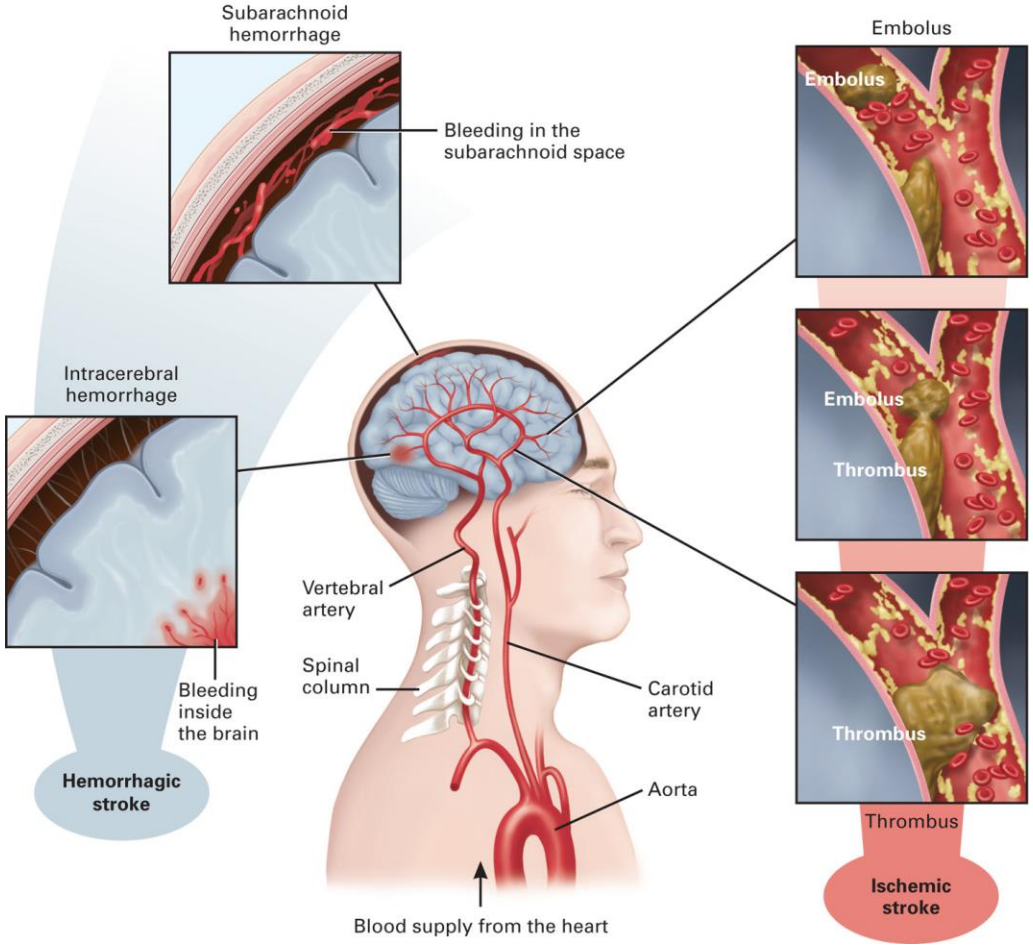
Causes of Stroke Blood is carried from the heart to the brain via the carotid and vertebral arteries, which form a ring and branches within the brain. A *hemorrhagic stroke* occurs when a cerebral artery ruptures and bleeds into the brain (examples shown: subarachnoid bleeding on the surface of the brain; intracerebral bleeding within the brain). An *ischemic stroke* occurs when a thrombus is formed on the wall of an artery or when an embolus travels from another area until it lodges in and blocks an arterial branch.



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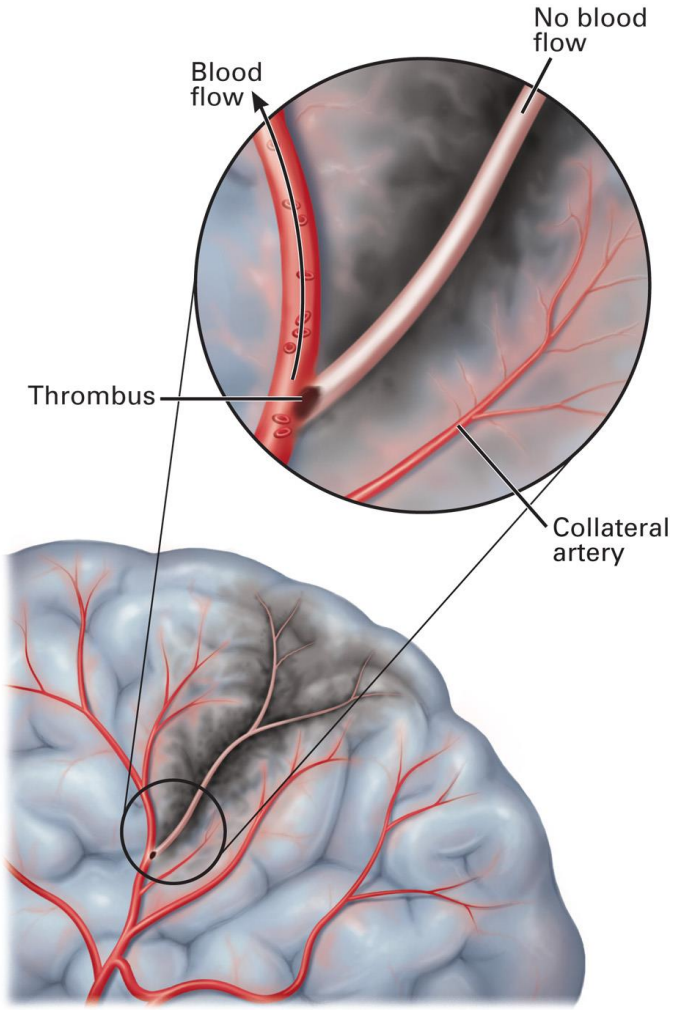
Ischemia, Infarction, and Collateral Flow Brain tissues distal to a rupture, thrombus, or embolus receive little or no perfusion and become ischemic (starved of oxygen) and eventually infarcted (dead). When a thrombus grows slowly enough, collateral arteries may form parallel to the blocked artery to perfuse or partially perfuse the oxygen-starved area of the brain.



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PEARSON

Click on the statement that best describes a thrombotic stroke.

A. An artery in the brain ruptures, causing bleeding within the brain tissue.

B. A blood clot forms in the left side of the heart and travels through the arterial system into the brain, causing an obstruction to blood flow.

C. An artery on the surface of the brain ruptures, causing bleeding between the brain and the skull.

D. A blood clot forms at the site of a damaged artery within the brain, causing an obstruction to blood flow.

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Stroke

- It is difficult to distinguish between types of stroke in the prehospital setting.
- Collect an accurate history to assist hospital personnel in determining the continuing care .
- Patients with an ischemic stroke may be eligible to receive fibrinolytic drugs.

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Stroke

- Signs and symptoms of stroke depend on the area of the brain affected.
- Common signs include problems with speech, sensation, and muscle function.
- Paralysis is usually one-sided.

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The stroke patient will often suffer paralysis affecting the face and extremities on one side of the body.

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Stroke

- Transient ischemic attack (TIA)
  - Same signs and symptoms as stroke
  - Symptoms disappear, usually within 1 hour.
  - The emergency care for TIA is the same as for stroke.

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Stroke

- Scene size-up
  - Determine the nature of the problem.
  - Note where the patient is found.

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Stroke

- Primary assessment
  - Muscle paralysis or altered mental status can impair the airway and gag reflex.
  - Assess the airway and suction as needed.
  - Position the patient.
  - Use an airway adjunct, as needed.

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Stroke

- Primary assessment
  - Assess for inadequate breathing and abnormal breathing patterns.
  - Apply oxygen if the SpO_2 is <94%.

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Stroke

- Secondary assessment
  - Findings suspicious for stroke include:
    - Sudden weakness of face or extremities
    - Trouble speaking
    - Difficulty seeing
    - Problems walking or loss of balance or coordination
    - Sudden, severe headache

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Stroke

- Secondary assessment
  - Reassure the patient.
  - Obtain a history.
  - Perform a physical exam.
  - Obtain baseline vital signs.

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Stroke

- Secondary assessment
  - Perform a rapid head-to-toe assessment to look for injuries.
  - Inspect the face.
  - Assess the ability to follow commands.
  - Check for motor function and sensation in the extremities.

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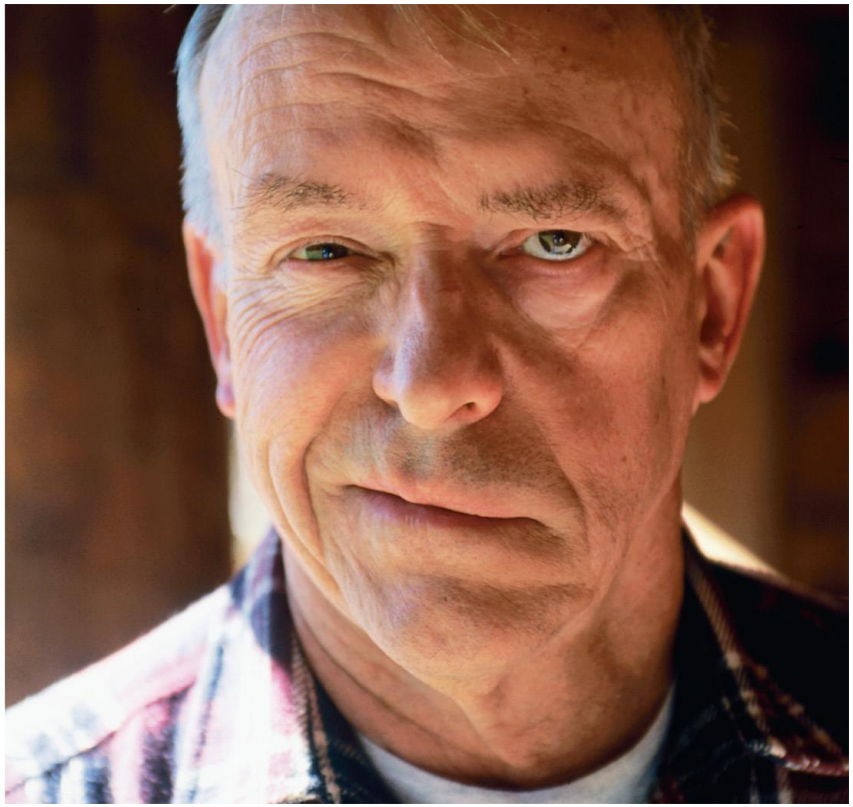
(a) The face of a nonstroke patient has normal symmetry. (b) The face of a stroke patient often has an abnormal, drooped appearance on one side. (© Michal Heron)



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(a) A patient who has not suffered a stroke can generally hold arms in an extended position with eyes closed. (b) A stroke patient will often display “arm drift” or “pronator drift”; that is, one arm will remain extended, when held outward with eyes closed, but the other arm will drift or drop downward and pronate (turn palm downward).

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Stroke

- Secondary assessment
  - Use one of the validated stroke assessment scales,
    - Cincinnati Prehospital Stroke Scale (CPSS)
    - Los Angeles Prehospital Stroke Screen (LAPSS)
  - A single abnormal stroke scale finding is highly suggestive of stroke.

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The Cincinnati Prehospital Stroke Scale.

Cincinnati Prehospital Stroke Scale

Sign of Stroke	Paient Activity	Interpretation
Facial droop	Have patient look up at you, smile, and show his teeth.	*Normal*: Symmetry to both sides. *Abnormal*: One side of the face droops or does not move symmetrically.
Arm drift	Have patient lift arms up and hold them out with eyes closed for 10 seconds.	*Normal:* Symmetrical movement in both arms. *Abnormal*: One arm drifts down or asymmetrical movement of the arms.
Abnormal speech	Have the patient say, "You can't teach an old dog new tricks."	*Normal:* The correct words are used and no slurring of words is noted. *Abnormal*: The words are slurred, the wrong words are used, or the patient is aphasic.

Kothari R. U., Pancioli A., Liu T., Broderick J. Cincinnati Prehospital Stroke Scale: Reproducibility and validity. *Annals of Emergency Medicine*. 1999; 33:373–378.

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The Los Angeles Prehospital Stroke Screen (LAPSS).

Los Angeles Prehospital Stroke Screen (LAPSS)

Considerations	Yes	Unknown	No
Age **greater than** 45 years			
No history of seizures or epilepsy			
Duration of symptoms is **less** than 24 hours			
Patient is **not** wheelchair bound or bedridden			
Blood glucose level **between 60 and 400 mg/dL**			
Physical exam to determine unilateral asymmetry	**Equal**	**R Weakness**	**L Weakness**
A. Have patient look up, smile, and show teeth		Droop	Droop
B. Compare grip strength of upper extremities		Weak grip No grip	Weak grip No grip
C. Assess arm strength for drift weakness		Drifts down Falls rapidly	Drifts down Falls rapidly

Kidwell C. S., Saver J. L., Schubert G. B., Eckstein M., Starkman S. Design and retrospective analysis of the Los Angeles Prehospital Stroke Screen (LAPSS). *Prehospital Emergency Care*. 1998; 2:267–273.
Kidwell C. S., Starkman S., Eckstein M., Weems K., Saver J. L., Identifying stroke in the field: Prospective validation of the Los Angeles Prehospital Stroke Screen (LAPSS). *Stroke*. 2000; 31:71–76.

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Stroke

- Secondary assessment
  - Reassess, repeating the stroke scale every 5 minutes.
  - Check the blood glucose level, according to protocol.

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Stroke

- Ask the following:
  - When did the symptoms begin?
  - Is there a history of recent head trauma?
  - Is there a history of previous stroke?
  - Was there any seizure activity?
  - What was the patient doing when signs and symptoms began?

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Stroke

- Ask the following:
  - Is there a history of diabetes?
  - Is there a complaint of headache or stiff neck?
  - Is there a complaint of dizziness, nausea, vomiting, or weakness?
  - Has there been slurred speech?

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Stroke

- Ask the following:
  - Does the patient take anticoagulants?
  - Is there a history of hypertension?
  - Has the patient taken stimulant drugs?
  - Was the onset sudden or gradual?

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Stroke

- Ask the following:
  - Did the signs and symptoms get progressively worse or better?
  - Did weakness or paralysis first affect one part and then progress to other parts?
  - Is there a history of atrial fibrillation or irregular heartbeat?

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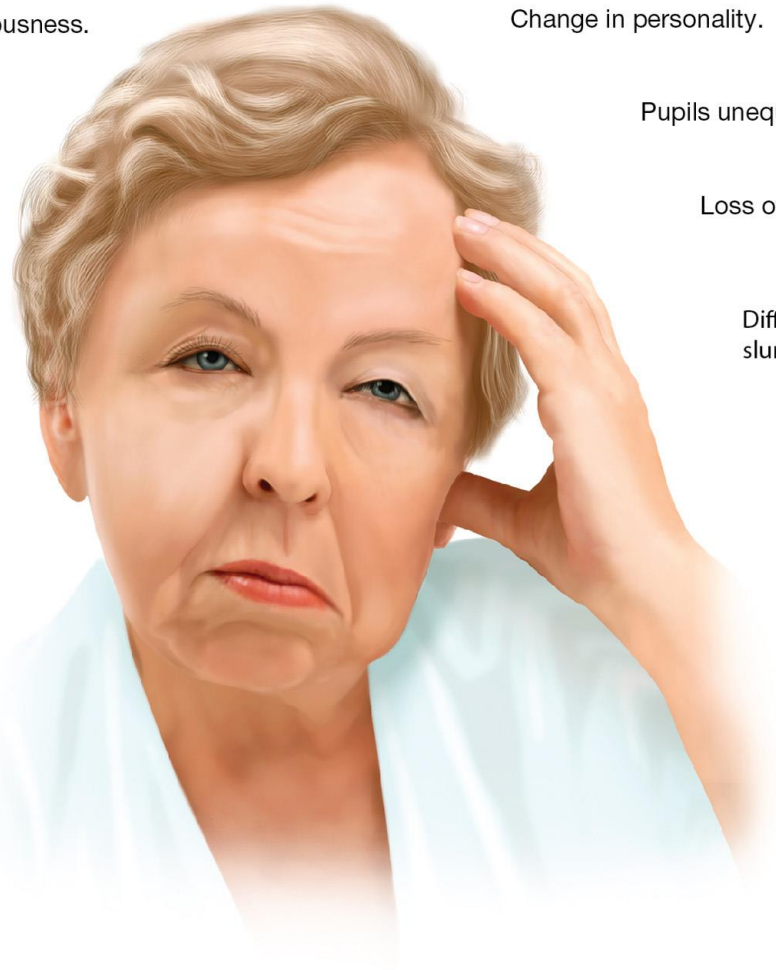
Stroke and transient ischemic attack (TIA) are conditions that may result from nontraumatic brain injury. Loss of speech, sensory, or motor function and altered mental status are among the possible signs and symptoms. Facial asymmetry is a common sign.

GENERAL SIGNS AND SYMPTOMS OF STROKE



Decreased consciousness.

Severe headache.

Drooping eyelid and mouth on one side of face.

Paralysis or weakness on one or both sides of the body.

Arm drift.

Loss of bowel or bladder control.

Possible seizures.

Change in personality.

Pupils unequal in size.

Loss of vision, dimness, or double vision.

Difficulty speaking or slurred speech.

Inability to speak.

Nausea or vomiting.

Sudden weakness or paralysis of face, arm, or leg.

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Stroke

- Emergency medical care
  - Do not give more oxygen than the patient needs to maintain an SpO_2 of 94%.
  - Excess oxygen increases free radical production, which damages brain cells.

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Stroke

- Emergency medical care
  - Maintain a patient airway.
  - Suction as needed.
  - Assist ventilation as needed.
  - Maintain adequate oxygenation.
  - Position the patient.

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Place the unresponsive patient in a left lateral recumbent position if spinal injury is not suspected.

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Place the responsive patient in a supine position with the head and chest elevated if spinal injury is not suspected.

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Stroke

- Emergency medical care
  - Check the blood glucose level.
  - Protect paralyzed extremities.
  - Rapid transport
  - Reassess every 5 minutes.

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Headache

- Headache may be a condition in itself, or can be a symptom of another condition.

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Headache

- Types of headaches
  - Vascular headaches
    - Migraine
    - Hypertension
  - Cluster headaches
  - Tension headache
  - Organic, traction, or inflammatory headaches

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TABLE 18-1 Serious Causes of Headache

Tumor
Bleeding within the brain
Bleeding around the brain (subarachnoid hemorrhage)
Meningitis
Hypertension
Hypoglycemia
Carbon monoxide poisoning or other toxic inhalation
Fever
Hypoxemia
Stroke
Depression
Cyanide poisoning

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Headache

- Suspect a serious underlying condition with any of the following findings:
  - Altered mental status
  - Motor or sensory deficit
  - Behavior change
  - Seizure

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Headache

- Suspect a serious underlying condition with any of the following findings:
  - First experience of this type of headache with abrupt onset
  - Worsening of pain with coughing, sneezing, or bending over
  - Fever or stiff neck
  - Change in the quality of a chronic headache

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Headache

- Emergency medical care
  - Establish and maintain an airway.
  - Be prepared to suction.
  - Assess and maintain adequate ventilation.
  - Administer oxygen for an SpO_2 >94%.

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Headache

- Emergency medical care
  - Place the patient in a position of comfort.
  - Be prepared for seizures.
  - Transport

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Case Study Conclusion

Because of Mr. Hewlett's slurred speech, both EMTs are immediately aware of the potential for airway compromise. Fred carefully assesses the airway and breathing as Reese asks Mrs. Hewlett what happened.

Mr. Hewlett is alert, and appears frustrated at his difficulty in making himself understood. Fred assures him that they will quickly do what they need to do and then will get him to the hospital for further assessment and care.

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Case Study Conclusion

Fred's stroke scale assessment confirms the facial droop and difficulty speaking, and reveals a slight weakness of Mr. Hewlett's left hand. Mr. Hewlett is able to maintain a sitting position, so the EMTs position him in semi-Fowler's position on the stretcher.

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Case Study Conclusion

Meanwhile, Reese was able to obtain information from Mrs. Hewlett, including the time of onset of signs and symptoms, which the EMTs know will be important in determining Mr. Hewlett's ongoing treatment in the hospital.

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Lesson Summary

- Causes of AMS include structural and metabolic-toxic causes.
- Strokes may be ischemic or hemorrhagic.
- Time is of the essence in the management of stroke.

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Lesson Summary

- Use a validated stroke scale to assess patients with suspected stroke.
- Headache may be a condition itself, or a symptom of an underlying condition.

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