



Chapter 15

Neurologic Emergencies

Introduction (1 of 4)

- Stroke is the third leading cause of death in the United States.
 - After heart disease and cancer
- It is common in geriatric patients.
- More men than women have strokes.
 - Strokes are more likely fatal in women.

Introduction (2 of 4)



- Other contributing factors include family history and race.
- Revolutionary treatments are available for stroke.
 - Many hospitals are certified stroke centers.
 - Rapid transport is vital.
- Seizures and altered mental status (AMS) may also occur.

Introduction (3 of 4)

- Seizures may occur as a result of:
 - A recent or an old head injury
 - A brain tumor
 - A metabolic problem
 - A genetic disposition

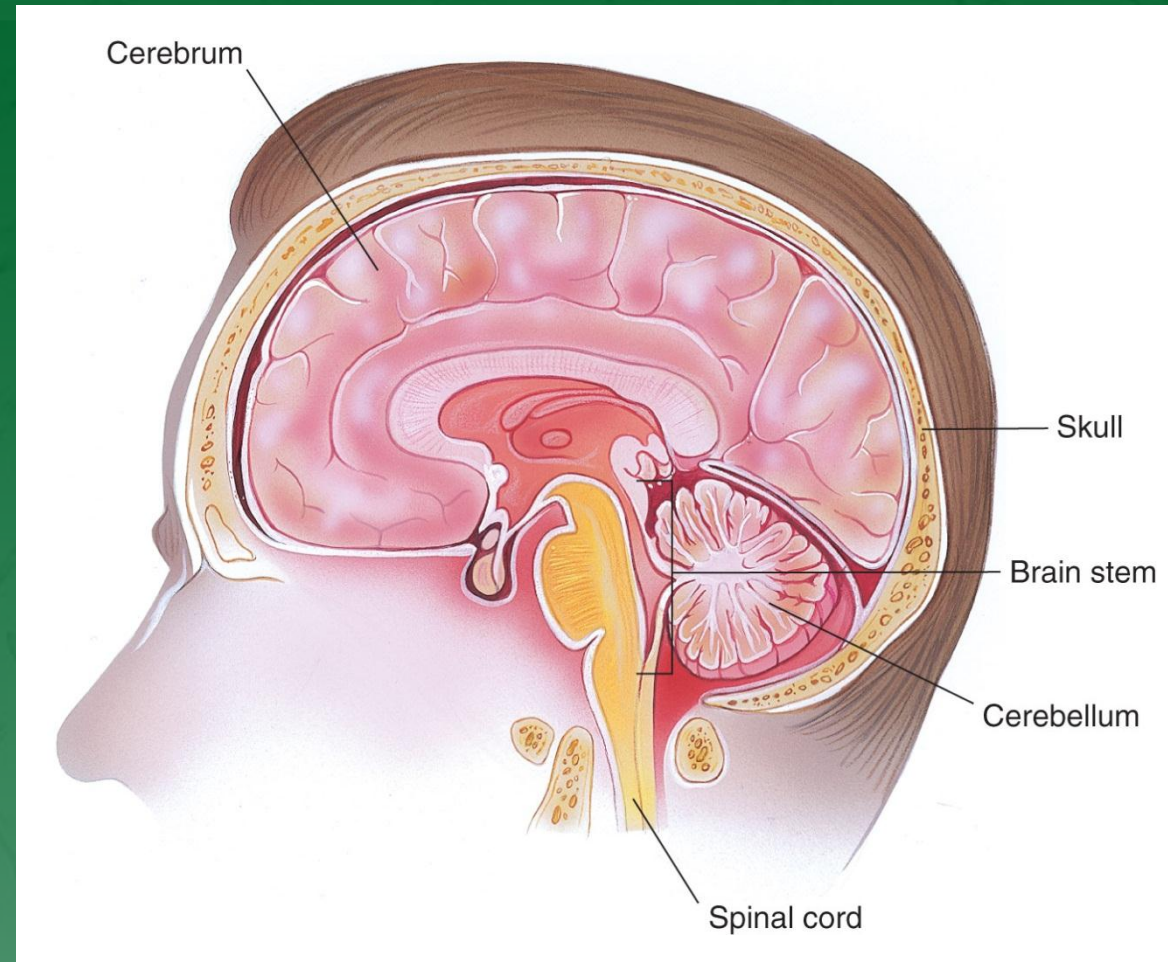
Introduction (4 of 4)

- Possible causes of AMS include:
 - Intoxication
 - Head injury
 - Hypoxia
 - Stroke
 - Metabolic disturbances
- Treatment varies widely.

Anatomy and Physiology (1 of 7)

- The brain is the body's computer.
 - Controls breathing, speech, and all body functions
- Three major parts: brain stem, cerebellum, and cerebrum
 - The cerebrum is the largest part.

Anatomy and Physiology (2 of 7)



Anatomy and Physiology (3 of 7)

- The brain stem controls the most basic functions.
 - Breathing, blood pressure, swallowing, pupil constriction
- The cerebellum controls muscle and body coordination.
 - Walking, writing, playing piano

Anatomy and Physiology (4 of 7)

- The cerebrum is divided into right and left hemispheres.
 - Each controls activities on the opposite side of the body.
 - The front of the cerebrum controls emotion and thought.
 - The middle controls touch and movement.
 - The back processes sight.

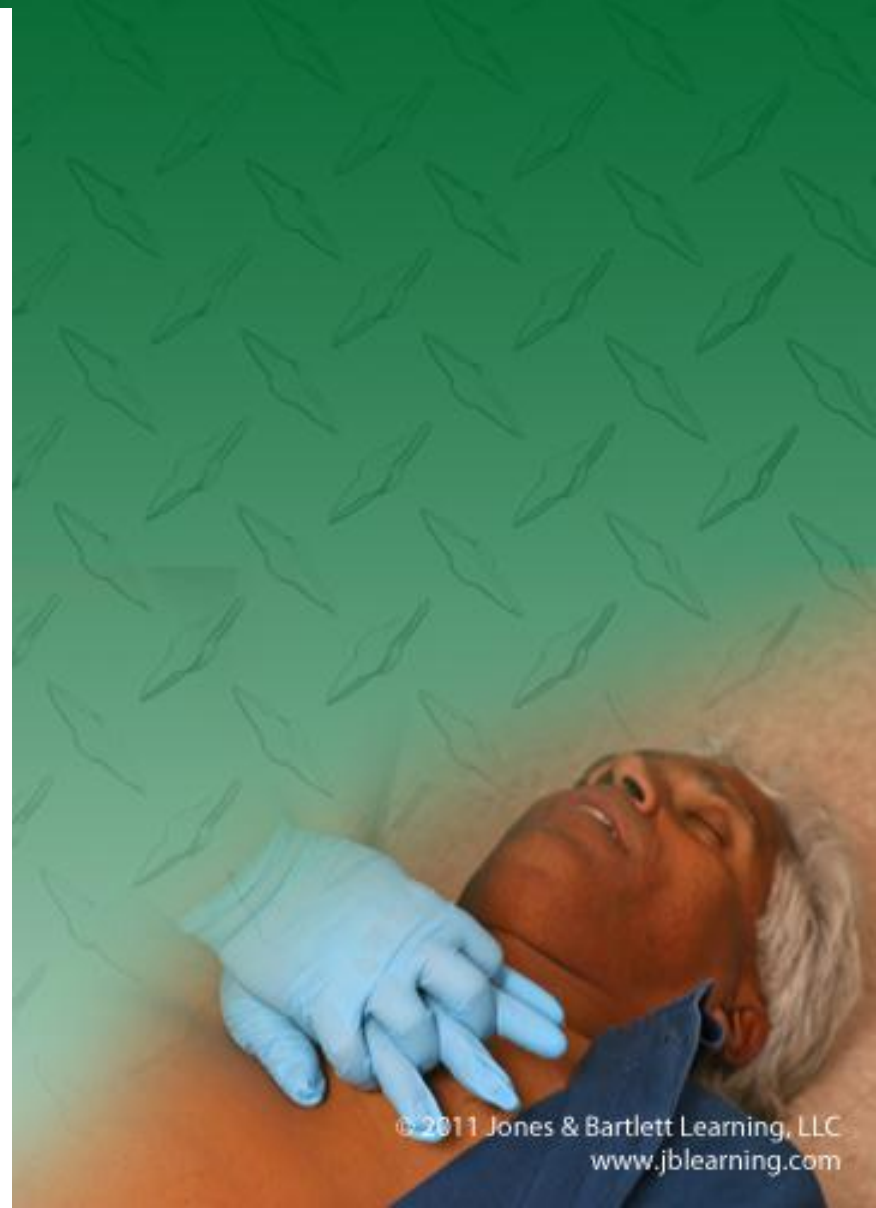
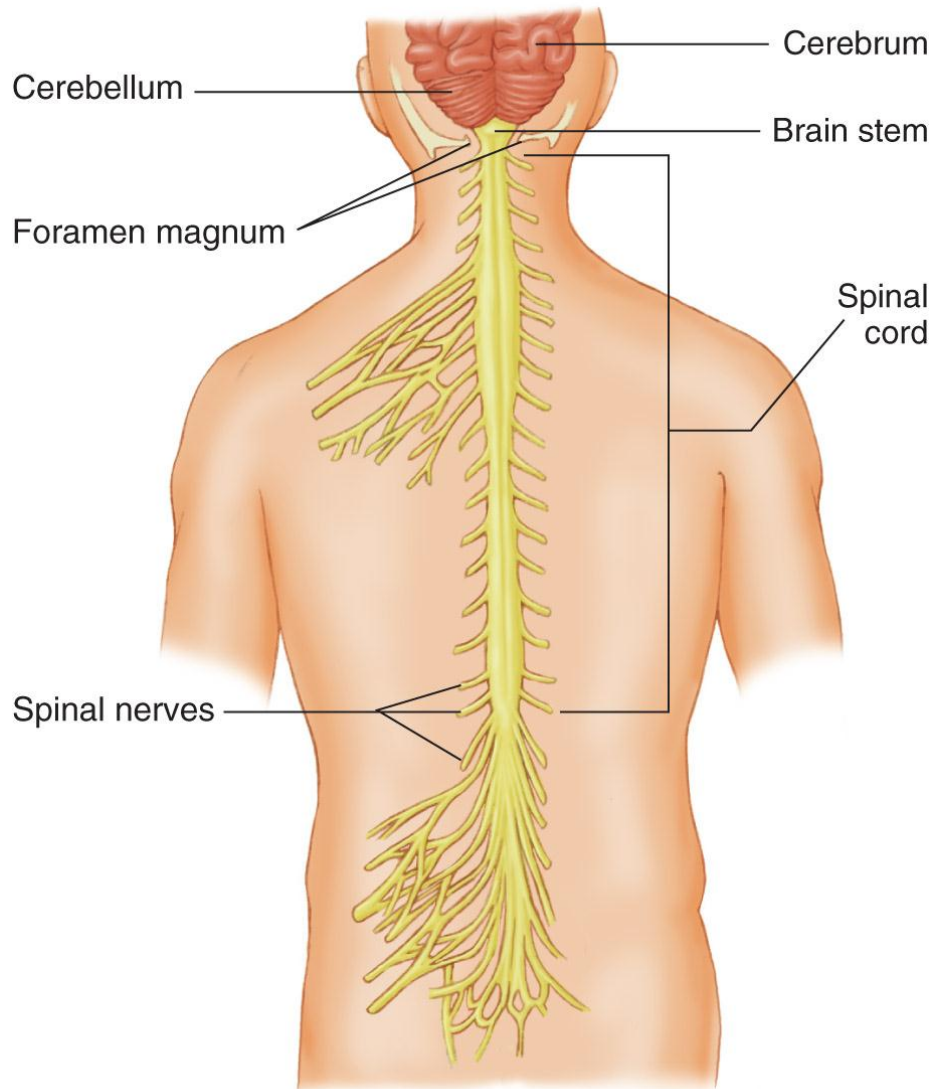
Anatomy and Physiology (5 of 7)

- In most people, speech is controlled on the left side of the brain near the middle of the cerebrum.
- Messages sent to and from the brain travel through nerves.
 - Twelve cranial nerves run directly from the brain to parts of the head: eyes, ears, nose, and face.

Anatomy and Physiology (6 of 7)

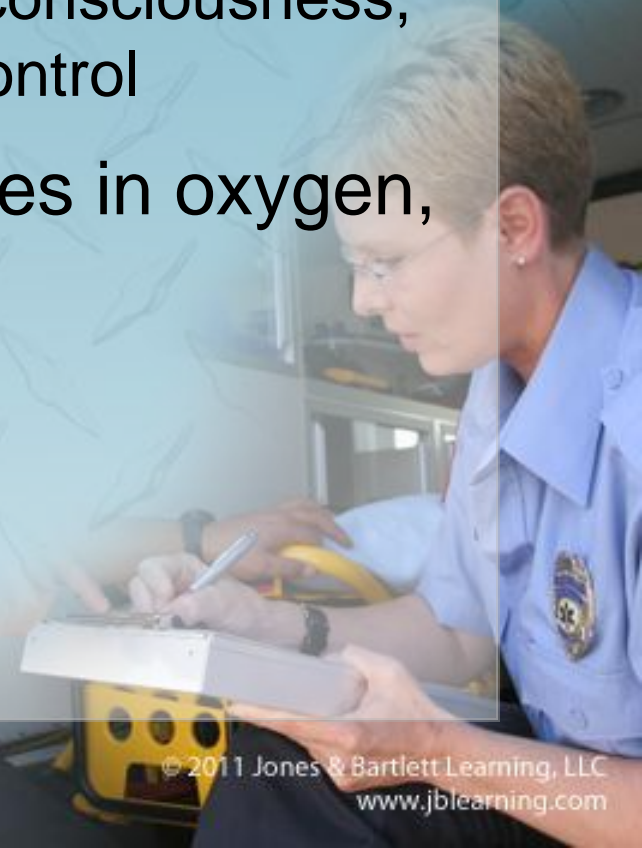
- The rest of the nerves join in the spinal cord and exit the brain through a large opening in the base of the skull called the foramen magnum.
 - At each vertebra in the neck and back, two nerves branch out (spinal nerves).
 - They carry signals to and from the body.

Anatomy and Physiology (7 of 7)



Pathophysiology (1 of 3)

- Many different disorders can cause brain dysfunction.
 - Can affect the patient's level of consciousness, speech, and voluntary muscle control
- The brain is sensitive to changes in oxygen, glucose, and temperature.



Pathophysiology (2 of 3)

- General rule:
 - If a problem is caused by the heart and lungs, the entire brain is affected.
 - If the problem is in the brain, only part of the brain is affected.



Pathophysiology (3 of 3)

- Stroke is common and potentially treatable.
- Other brain disorders include infection and tumor.
 - May cause seizures, AMS, and headaches



Headache (1 of 6)

- One of the most common complaints
- Can be a symptom of another condition or a neurologic condition on its own
- Most headaches are harmless and do not require emergency medical care.



Headache (2 of 6)

- Sudden, severe headache requires assessment and transport.
 - If more than one patient reports headache, consider carbon monoxide poisoning.
- Tension headaches, migraines, and sinus headaches are the most common.
 - Not medical emergencies



Headache (3 of 6)

- Tension headaches are the most common.
 - Caused by muscle contractions in the head and neck
 - Attributed to stress
 - Pain is usually described as squeezing, dull, or as an ache.



Headache (4 of 6)

- Migraine headaches are the second most common.
 - Thought to be caused by changes in the blood vessel size in the base of the brain
 - Pain is usually described as pounding, throbbing, and pulsating.
 - Often associated with visual changes
 - Can last for several days



Headache (5 of 6)

- Sinus headaches
 - Caused by pressure that is the result of fluid accumulation in the sinus cavities
 - Patients may also have coldlike symptoms of nasal congestion, cough, and fever.
 - Prehospital emergency care is not required.



Headache (6 of 6)

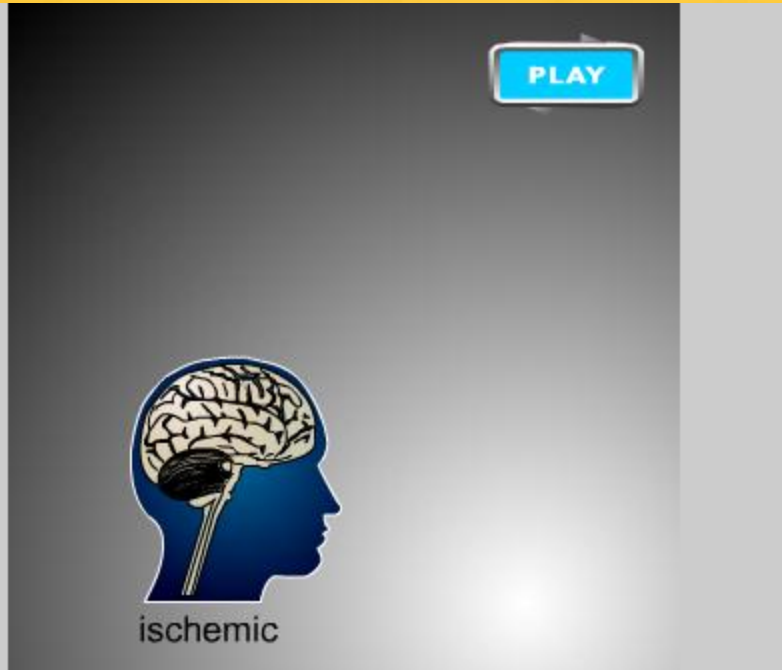
- Serious conditions that include headache as a symptom are hemorrhagic stroke, brain tumors, and meningitis.
 - You should be concerned if the patient complains of a sudden-onset, severe headache or a sudden headache that has associated symptoms.



Stroke (1 of 2)

- Also called a cerebrovascular accident (CVA)
- Interruption of blood flow to the brain
- Results in the loss of brain function
- Once the brain cells die, not much can be done.

Stroke (2 of 2)

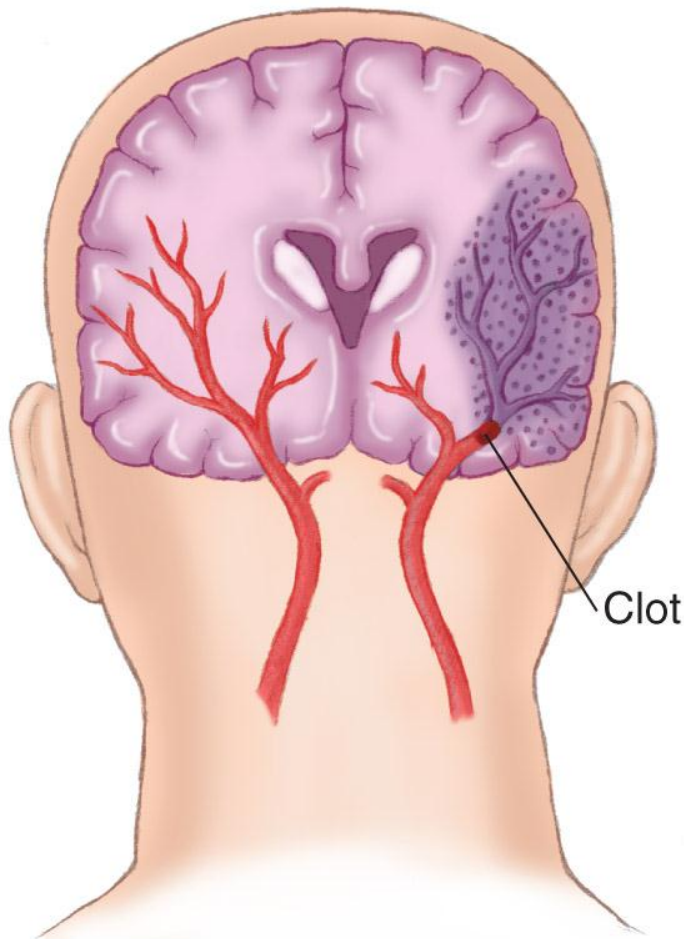


- However, prompt restoration of blood flow can preserve or restore function.
 - “Time is brain.”
- There are two main types of stroke: ischemic and hemorrhagic.

Ischemic Stroke (1 of 2)

- Most common, accounting for more than 80% of strokes
- Results from an embolism or thrombosis
- Symptoms may range from nothing at all to complete paralysis.
- Atherosclerosis in the blood vessels is often the cause.

Ischemic Stroke (2 of 2)



- Atherosclerosis
 - Plaque forms inside the walls of the blood vessels and may obstruct blood flow.
 - Eventually, it causes complete occlusion of an artery.

Hemorrhagic Stroke (1 of 3)

- Accounts for 10% to 20% of strokes
- Results from bleeding inside the brain
- People at high risk include those experiencing stress or exertion.
- People at highest risk are those who have very high blood pressure.

Hemorrhagic Stroke (2 of 3)



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- Cerebral hemorrhages are often fatal.
- An aneurysm is a swelling or enlargement of an artery due to weakening of the arterial wall.

Hemorrhagic Stroke (3 of 3)

- A symptom may be the sudden onset of a severe headache.
- When a hemorrhagic stroke occurs in an otherwise healthy young person, it is likely caused by a berry aneurysm.
 - Surgical repair may be possible if care is sought immediately.

Transient Ischemic Attack (TIA) (1 of 2)

- Normal processes in the body break up a blood clot in the brain.
 - Blood flow is restored.
 - The patient regains use of the affected body part.
 - This often indicates a serious medical condition that may prove fatal.

Transient Ischemic Attack (TIA) (2 of 2)

- When stroke symptoms go away on their own in less than 24 hours, the event is called a TIA.
- Every TIA is an emergency.
- May be a warning sign of a larger stroke to come

Signs and Symptoms of Stroke

(1 of 5)

- Facial drooping
- Sudden weakness or numbness in the face, arm, leg, or one side of body
- Loss of movement and sensation on one side of the body
- Lack of muscle coordination (ataxia)

Signs and Symptoms of Stroke

(2 of 5)

- Sudden vision loss in one eye, blurred and double vision
- Difficulty swallowing
- Decreased or increased level of responsiveness
- Speech disorders (dysphasia)

Signs and Symptoms of Stroke

(3 of 5)

- Difficulty expressing thoughts or inability to speak or understand others
- Slurred speech (dysarthria)
- Decreased or absent movement in one or more extremities
- Sudden and severe headache

Signs and Symptoms of Stroke

(4 of 5)

- Sudden loss of balance or trouble walking
- Confusion
- Dizziness
- Weakness
- Combativeness

Signs and Symptoms of Stroke

(5 of 5)

- Restlessness
- Tongue deviation
- Coma

Left Hemisphere

- Stroke in the left cerebral hemisphere may cause aphasia.
 - Inability to produce or understand speech
 - Speech problems can vary widely.
- Stroke may also cause paralysis of the right side of the body.



Right Hemisphere

- Stroke may cause paralysis of the left side of the body.
- Usually, patients can understand language and are able to speak, but their words may be slurred.
- Patients may be oblivious to their problem (neglect).



Bleeding in the Brain

- Patients will have high blood pressure.
 - May be the cause *of* the bleeding
 - May be caused *by* the bleeding, as a compensatory response
- Monitor the blood pressure and watch for trends.

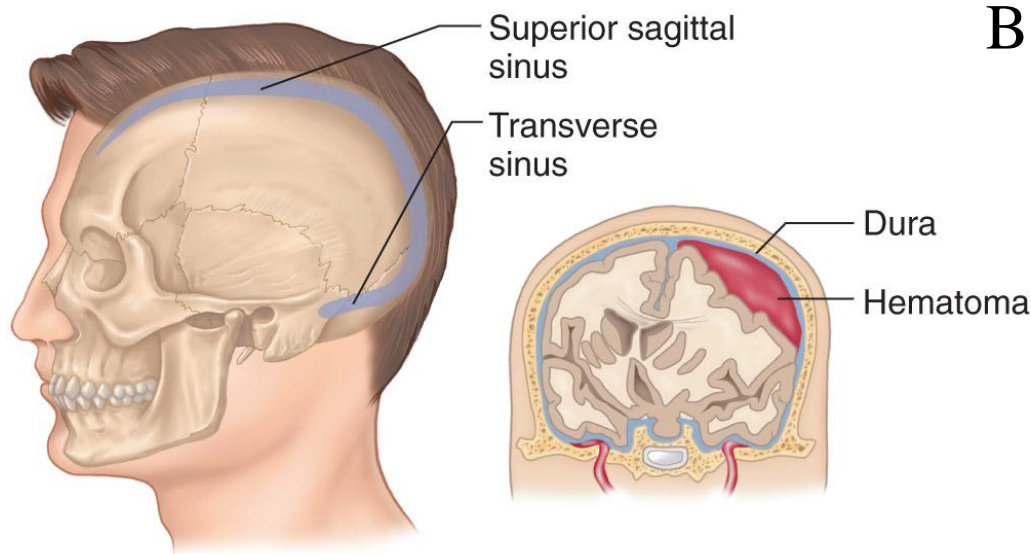
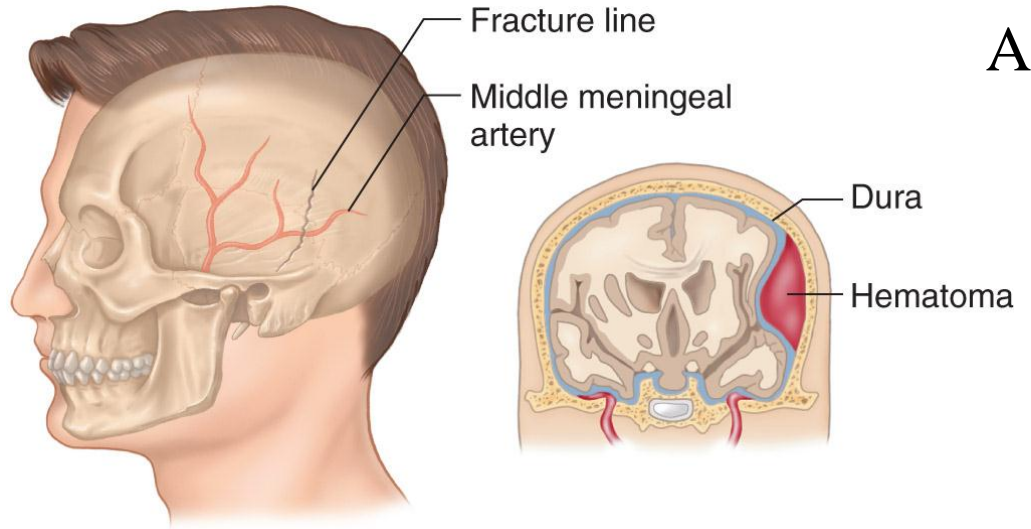


Conditions That May Mimic Stroke (1 of 2)

- Hypoglycemia
 - Not enough blood glucose
- Postictal state
 - Period following seizure that lasts between 5 and 30 minutes
- Subdural or epidural bleeding
 - Blood near the skull presses on the brain



Conditions That May Mimic Stroke (2 of 2)



A. Epidural bleeding:
Bleeding outside dura
and under skull.

A. Subdural bleeding:
Bleeding under
the dura but outside skull.

Seizures

- A seizure, or convulsion, is a temporary alteration in consciousness.
- Account for up to 30% of EMS calls
- In the United States, it is estimated that 4 million people have epilepsy.



Generalized Seizure

- Formally called a grand mal seizure
- Typically characterized by unconsciousness and a generalized severe twitching of all muscles
- Results from abnormal discharges from large areas of the brain, usually involving both hemispheres

Partial Seizure (1 of 2)

- Simple partial seizure
 - No change in the patient's level of consciousness
 - May have numbness, weakness, dizziness, visual changes, or unusual smells/tastes
 - May have some twitching or brief paralysis



Partial Seizure (2 of 2)

- Complex partial seizure
 - Altered mental status
 - Results from abnormal discharges from the temporal lobe of the brain
 - Lip smacking, eye blinking, isolated jerking
 - Uncontrollable fear

Tonic-Clonic Seizure (1 of 2)

- Characterized by sudden loss of consciousness, chaotic muscle movement and tone, and apnea
 - Often preceded by an aura
- Tonic phase: Bilateral muscle rigidity
- Clonic phase: Muscle contraction and relaxation lasting 1 to 3 minutes

Tonic-Clonic Seizure (2 of 2)

- Tachycardia, hyperventilation, sweating, and intense salivation
- Most seizures last 3 to 5 minutes.
- Postictal state (5 to 20 minutes) follows.
 - Gradual return to consciousness



Absence Seizure

- Formerly called petit mal
- Last for seconds
- Patient fully recovers with a brief lapse of memory

Status Epilepticus

- Seizures lasting more than 5 minutes are likely to progress to status epilepticus.
- Seizures that continue every few minutes without the person regaining consciousness or last longer than 30 minutes are referred to as status epilepticus.



Causes of Seizures (1 of 3)

Table 15-1 Common Causes of Seizures

Type	Cause
Epileptic	Congenital origin
Structural	Tumor (benign or cancerous) Infection (brain abscess) Scar tissue from injury Head trauma Stroke
Metabolic	Hypoxia Abnormal blood chemical values Hypoglycemia Poisoning Drug overdose Sudden withdrawal from alcohol, medications
Febrile	Sudden high fever

- Some seizure disorders are congenital.
- Others may be caused by high fever, structural problems in the brain, or metabolic or chemical problems.

Causes of Seizures (2 of 3)

- Epileptic seizures usually can be controlled by medications.
- Seizures may be caused by an abnormal area in the brain, such as:
 - A benign or cancerous tumor
 - An infection (brain abscess)
 - Scar tissue from some type of injury

Causes of Seizures (3 of 3)

- Seizures from a metabolic cause can result from:
 - Abnormal levels of certain blood chemicals
 - Hypoglycemia
 - Poisons
 - Drug overdoses
 - Sudden withdrawal from routine heavy alcohol or sedative drug use

The Importance of Recognizing Seizures (1 of 2)

A paramedic in a blue uniform is pushing a gurney in a hospital setting. The gurney has a yellow safety rail. In the background, there is a sign that says "EMERGENCY MEDICAL SERVICES".

- Recognize when a seizure is occurring and whether this episode differs from previous ones.
 - Patient may turn cyanotic.
 - Seizures may prevent the patient from breathing.
 - In a patient with diabetes, the blood glucose value may drop.

The Importance of Recognizing Seizures (2 of 2)

A paramedic in a blue uniform is pushing a gurney in an emergency medical services setting. The background shows a sign that reads "EMERGENCY MEDICAL SERVICES".

- You must look at other problems associated with the seizure.
 - Patients who have fallen during a seizure may have a head injury.
 - Patients having a generalized seizure may also experience incontinence.

The Postictal State (1 of 2)

- After a seizure, the muscles relax, becoming almost flaccid, and breathing becomes labored.
 - With normal circulation and liver function, the patient will begin to breathe more normally within minutes



The Postictal State (2 of 2)

- Most commonly characterized by lethargy and confusion
 - The patient may be combative.
 - Be prepared for these circumstances.
- If the patient's condition does not improve, consider hypoglycemia or infection.



Altered Mental Status



- Most common neurologic emergency
- Patient is not thinking clearly or is incapable of being aroused.
- Causes include hypoglycemia, hypoxemia, intoxication, overdose, head injury, brain infection, tumors, poisoning.

Causes of AMS (1 of 3)

- Hypoglycemia
 - Patients can have signs and symptoms that mimic stroke and seizures.
 - May have hemiparesis
 - A patient who has had a stroke may be alert and attempting to communicate.
 - A patient with hypoglycemia almost always has an altered or decreased LOC.



Causes of AMS (2 of 3)

- Hypoglycemia (cont'd)
 - Patients can also experience seizures.
 - The mental status is not likely to improve, even after several minutes.
 - Consider hypoglycemia in a patient who has AMS after an injury such as a motor vehicle crash.



Causes of AMS (3 of 3)

- Other causes of AMS
 - Your consideration becomes important because a patient with AMS may be combative and refuse treatment/transport.
 - In most cases, a patient who appears intoxicated is just that.
 - Psychological problems and complications of medications are possible causes.



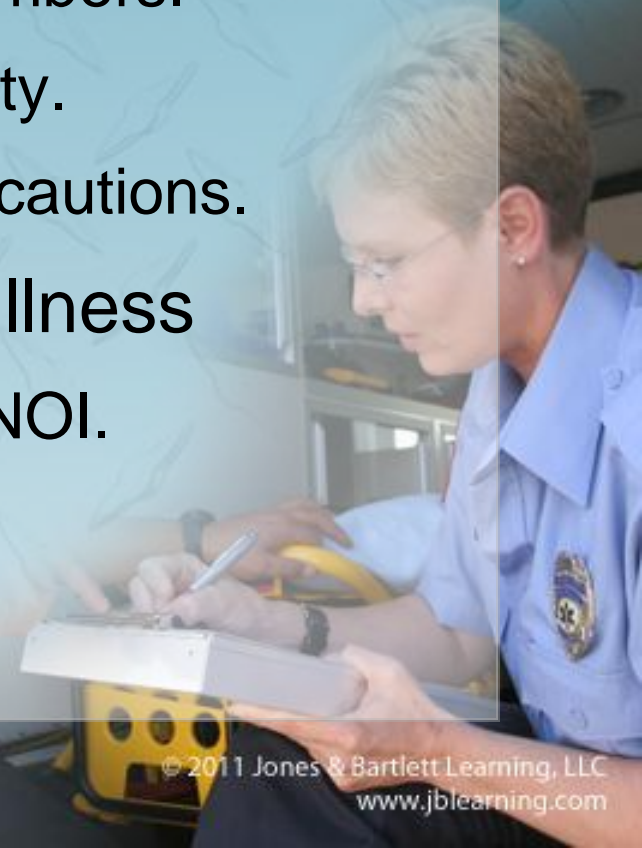
Patient Assessment

- Patient assessment steps
 - Scene size-up
 - Primary assessment
 - History taking
 - Secondary assessment
 - Reassessment



Scene Size-up (1 of 2)

- Scene safety
 - Do not be distracted by the seriousness of the situation or frightened family members.
 - Look first for threats to your safety.
 - Consider the need for spinal precautions.
- Mechanism of injury/nature of illness
 - Look for clues to determine the NOI.



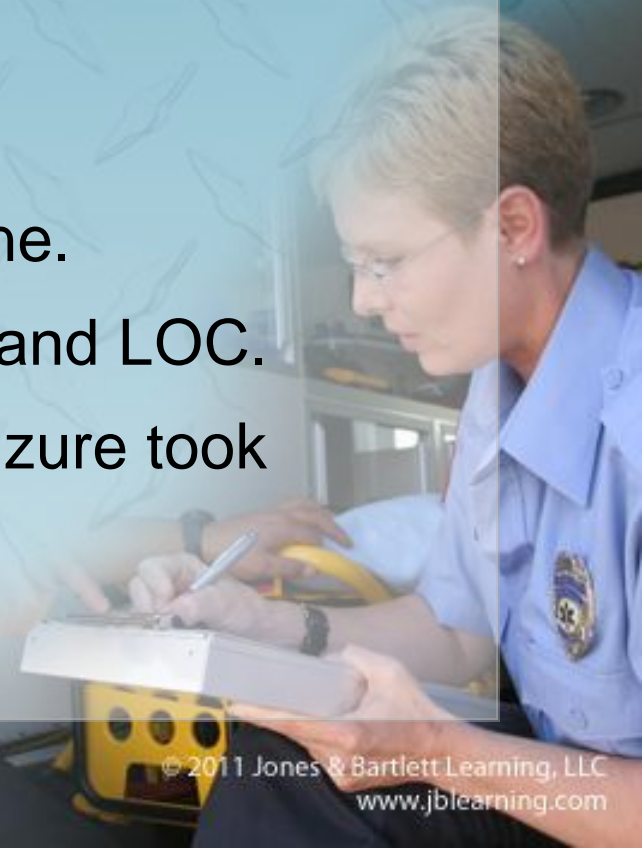
Scene Size-up (2 of 2)

- Mechanism of injury/nature of illness (cont'd)
 - Special considerations for a patient with a suspected neurologic emergency:
 - An evaluation of the potential trauma
 - Indications of a previous medical condition
 - Evidence of a seizure



Primary Assessment (1 of 4)

- Look for and treat life-threatening conditions.
- Perform a rapid scan.
- Form a general impression.
 - Gather information from the scene.
 - Note the patient's body position and LOC.
 - You should be able to tell if a seizure took place.



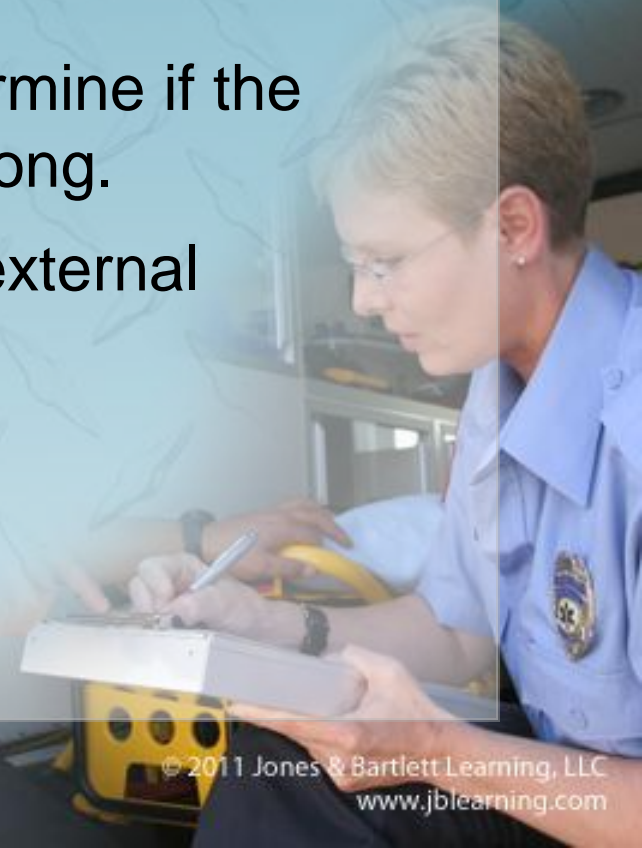
Primary Assessment (2 of 4)

- Airway and breathing
 - Patients may have difficulty swallowing and choke on their own saliva.
 - Check for foreign body obstruction.
 - Assess the patient's breathing.
- Circulation
 - Check the pulse if the patient is unresponsive.



Primary Assessment (3 of 4)

- Circulation (cont'd)
 - If no pulse is found, immediately begin CPR and attach an AED.
 - If the patient is responsive, determine if the pulse is fast or slow, weak or strong.
 - Evaluate the patient quickly for external bleeding.



Primary Assessment (4 of 4)

- Transport decision
 - Establish priorities based on your assessment of the patient's LOC and ABCs.
 - If the patient is experiencing a stroke, rapidly transport to an appropriate facility.



History Taking (1 of 2)

- Investigate the chief complaint.
 - For unresponsive patients, gather any history from family or bystanders.
 - If no one is around, quickly look for explanations for the AMS.
 - Evaluate a responsive patient's speech.

History Taking (2 of 2)

- Gather a SAMPLE history.
 - Time is critical.
 - Try to determine the exact time the patient last appeared healthy.
 - Collect or list all medications.
 - Ask if the patient has a history of seizures.
 - If not, a serious condition should be suspected.

Secondary Assessment (1 of 7)

- Physical examinations
 - Full-body scan
 - Direct particular attention to your neurologic assessment.
- Stroke assessment
 - Cincinnati Prehospital Stroke Scale
 - Los Angeles Prehospital Stroke Screen

Secondary Assessment (2 of 7)

Table 15-2 Cincinnati Prehospital Stroke Scale

Test	Normal	Abnormal
Facial Droop (Ask patient to show teeth or smile.)	Both sides of face move equally well.	One side of face does not move as well as other.
Arm Drift (Ask patient to close eyes and hold both arms out with palms up.)	Both arms move the same, or both arms do not move.	One arm does not move, or one arm drifts down compared with the other side.
Speech (Ask patient to say, "The sky is blue in Cincinnati.")	Patient uses correct words with no slurring.	Patient slurs words, uses inappropriate words, or is unable to speak.



Secondary Assessment (3 of 7)

Table 15-3 Los Angeles Prehospital Stroke Screen

Criteria	Yes	Unknown	No
1. Age > 45 y	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. History of seizures or epilepsy absent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Symptoms < 24 h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. At baseline, patient is not wheelchair-bound or bedridden	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Blood glucose between 60 and 400 mg/dL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Obvious asymmetry (right versus left) in any of the following three exam categories (must be unilateral):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Equal	Right Weak	Left Weak
Facial smile/grimace	<input type="checkbox"/>	<input type="checkbox"/> Droop	<input type="checkbox"/> Droop
Grip	<input type="checkbox"/>	<input type="checkbox"/> Weak grip <input type="checkbox"/> No grip	<input type="checkbox"/> Weak grip <input type="checkbox"/> No grip
Arm strength	<input type="checkbox"/>	<input type="checkbox"/> Drifts down <input type="checkbox"/> Falls rapidly	<input type="checkbox"/> Drifts down <input type="checkbox"/> Falls rapidly

Interpretation: If criteria 1-6 are marked yes, the probability of a stroke is 97%.

Secondary Assessment (4 of 7)

- Stroke scales evaluate the face, arms, and speech.
- All patients with an AMS should also have a Glasgow Coma Scale (GCS) score calculated.

Secondary Assessment (5 of 7)

Table 15-4 Glasgow Coma Scale

Eye Opening		Best Verbal Response		Best Motor Response	
Spontaneous	4	Oriented conversation	5	Obeys commands	6
In response to speech	3	Confused conversation	4	Localizes pain	5
In response to pain	2	Inappropriate words	3	Withdraws to pain	4
None	1	Incomprehensible sounds	2	Abnormal flexion	3
		None	1	Abnormal extension	2
				None	1

Score: 13-15 may indicate mild dysfunction, although 15 is the score a person with no neurologic disabilities would receive.

Score: 9-12 may indicate moderate dysfunction.

Score: 8 or less is indicative of severe dysfunction.

Secondary Assessment (6 of 7)

- Vital signs
 - Significant intracranial bleeding leads to a great deal of pressure in the skull compressing the brain.
 - Slows the pulse and causes erratic respirations
 - Blood pressure is usually high to compensate for poor perfusion.

Secondary Assessment (7 of 7)

- Vital signs (cont'd)
 - If the patient has an AMS, check the blood glucose level.
 - During most active seizures, it is impossible to evaluate vital signs.
 - Vital signs in a postictal state will approximate normal.



Reassessment (1 of 7)

- Focus on reassessing the ABCs, vital signs, and interventions.
 - Stroke patients can lose airway or stop breathing without warning.
- Interventions
 - Based on assessment findings

Reassessment (2 of 7)

- Interventions (cont'd)
 - Stroke, seizure, hypoglycemia, and hypoxia are easier to identify.
 - Cause of other neurologic emergencies may not always be obvious.
 - The only reliable way to tell if there is bleeding in the brain is with a CT scan.

Reassessment (3 of 7)

Table 15-5 Tips on Patient Care

- Patients who experience a transient ischemic attack (TIA) may exhibit most of the same signs and symptoms as patients who are having a stroke. These signs and symptoms can last from minutes up to 24 hours. Therefore, the signs of stroke that you note on arrival may gradually disappear. Patients who appear to have had a TIA should be transported for further evaluation.
- Place the patient's affected or paralyzed extremity in a secure and safe position during patient movement and transport.
- Some patients who have had a stroke may be unable to communicate, but they can often understand what is being said around them. Be aware of this possibility.
- New therapies for stroke must be used as soon as possible after the start of symptoms. Minimize time on the scene, and notify the receiving hospital as soon as possible.

- Interventions (cont'd)
 - EMS systems designate specific hospitals for patients who may be having a stroke.
 - Notify the hospital staff as early as possible if you have a “stroke alert” patient.

Reassessment (4 of 7)

- Interventions (cont'd)
 - Supplemental oxygen is strongly advised.
 - For patients who are having a seizure:
 - Protect them from harm.
 - Maintain a clear airway by suctioning.
 - Provide oxygen as quickly as possible.

Reassessment (5 of 7)

- Interventions (cont'd)
 - For patients who continue to have a seizure, as in status epilepticus:
 - Suction the airway.
 - Provide positive-pressure ventilations.
 - Transport quickly to the hospital.
 - Rendezvous with ALS, if possible.

Reassessment (6 of 7)

- Communication and documentation
 - Call a “stroke alert” to designated stroke centers.
 - Be sure to communicate:
 - The time that the patient was last seen healthy
 - The findings of your neurologic examination
 - The time you anticipate arriving at the hospital

Reassessment (7 of 7)

- Communication and documentation (cont'd)
 - A key piece of information is the time of onset of the patient's signs and symptoms.
 - Document your findings from your stroke scale and the GCS score.
 - Describe the seizure activity.

Emergency Medical Care: Headache

- Most headaches are harmless and do not require emergency medical care.
- You should be concerned if the patient complains of:
 - A sudden-onset, severe headache
 - A sudden headache with fever, seizures, AMS, or following trauma



Emergency Medical Care: Migraine

- Always assess the patient for other signs and symptoms that might indicate a more serious condition.
- Apply high-flow oxygen, if tolerated.
- Provide a darkened, quiet environment.
- Do not use lights and sirens during transport.



Emergency Medical Care: Stroke (1 of 3)

- Support the ABCs and provide rapid transport to a stroke center.
- Patient may require manual airway positioning.
- Use suction as needed, provide high-flow oxygen, and monitor the patient's oxygen saturation.



Emergency Medical Care: Stroke (2 of 3)

- Paralyzed extremities will require protection from harm.
- Keep the patient informed.
- Thrombolytic therapy may reverse stroke symptoms.
 - The sooner the treatment is done, the better the prognosis.



Emergency Medical Care: Stroke (3 of 3)

- Spend as little time at the scene as possible.
 - Stroke is an emergency, and “time is brain.”



Emergency Medical Care: Seizure (1 of 3)

- The patient may be in a postictal state on your arrival.
- The patient may still be having a seizure:
 - Continue to assess and treat ABCs.
 - Try administering oxygen.



Emergency Medical Care: Seizure (2 of 3)

- It is difficult to safely package a seizure patient for transport.
 - Assess for trauma.
 - Use spinal precautions if indicated.
 - Never attempt to restrain a patient having a seizure.



Emergency Medical Care: Seizure (3 of 3)

- Not every patient who has had a seizure wants to be transported.
 - Your goal is to encourage the patient to be seen by a physician.
 - Be prepared to discuss the situation with the hospital staff.



Emergency Medical Care: Altered Mental Status

- Signs and symptoms vary from simple confusion to coma.
- AMS is always an emergency that requires immediate attention.
 - Even if the cause appears to be intoxication or minor head trauma



Summary (1 of 9)

- Many different disorders can cause brain or other neurologic symptoms. As a general rule, if the problem is primarily in the brain, only part of the brain will be affected. If the problem is in the heart or lungs, the whole brain will be affected.

Summary (2 of 9)

- Stroke is a significant brain disorder because it is common and potentially treatable.
- Seizures and AMS are also common, and you must learn to recognize the signs and symptoms of each condition.

Summary (3 of 9)

- Other causes of neurologic dysfunction include coma, infections, and tumors.
- Strokes occur when part of the blood flow to the brain is suddenly cut off; within minutes, brain cells begin to die.

Summary (4 of 9)

- You should always perform at least three neurologic tests on patients you suspect of having a stroke, assessing speech, facial movement, and arm movement.

Summary (5 of 9)

- Because current treatments for stroke must be administered within 1 to 3 hours (and preferably within 2 hours) of the onset of symptoms to be most effective, you should provide prompt transport.

Summary (6 of 9)

- Always notify the hospital as soon as possible that you are bringing in a patient with a possible stroke, so that staff there can prepare to test and treat the patient without delay.

Summary (7 of 9)

- Seizures are characterized by unconsciousness and generalized twitching of all or part of the body.
- There are three types of seizures that you should learn to recognize: generalized, partial, and status epilepticus.

Summary (8 of 9)

- Most seizures last between 3 and 5 minutes and are followed by a postictal state in which the patient may be unresponsive, have labored breathing, have hemiparesis, and may have been incontinent.

Summary (9 of 9)

- Among the most common causes of AMS are hypoglycemia, intoxication, drug overdose, and poisoning.