





2.5
CONTACT HOURS

Stroke!

An all-out assault on the brain

The effects of a stroke can be devastating, both physiologically and psychologically. Find out how a stroke affects the body and mind, how it's treated, and how you can help your patient recover.

LENORA M. MAZE, RN, CNRN, MSN

Clinical Nurse Specialist • Critical Care and Neuroscience Wishard Health Services • Indianapolis, Ind.

The author has disclosed that she has no significant relationship with or financial interest in any commercial companies that pertain to this educational activity.

STROKE—A SUDDEN interruption of blood supply to an area of the brain—can be deadly. Stroke is the third leading cause of death in the United States, after heart disease and cancer. About 700,000 people suffer a new or recurrent stroke each year, about one-quarter of them fatal. Nearly three-quarters of all strokes occur in people over age 65.

Stroke is a leading cause of serious, long-term disability. For those who survive it, life isn't the same. According to data from the Framingham Heart Study, 31% of stroke survivors need help caring for themselves; 20% need help walking; and 71% have a diminished ability to work. Patients who've had a stroke may have ongoing weakness or paralysis, decreased sensation, and poor memory. They may have trouble performing activities of daily living, such as thinking, speaking, or eating.

Types of strokes

There are four main types of stroke: two caused by blocked blood supply to the brain, and two by bleeding or hemorrhage. Cerebral thrombosis and cerebral embolism, caused by clots or particles that plug an artery,

are more common, accounting for about 87% of all strokes. Hemorrhagic strokes, which can be cerebral or subarachnoid, account for about 13% of all stroke cases. They occur when a blood vessel on the brain's surface ruptures and bleeds into the space between the brain and the skull. As the blood accumulates, it compresses the surrounding tissue. Let's take a closer look at each type of stroke.

Cerebral thrombosis, the most common type of stroke, occurs when a blood clot (thrombus) forms and blocks blood flow in an artery bringing blood to the brain. Blood clots usually form in arteries damaged by atherosclerosis (fatty plaque deposits on the vessel walls). They often develop at night or first thing in the morning, when blood pressure (BP) is low.

A **cerebral embolism** occurs when a wandering clot (embolus) or some other particle forms in a blood vessel away from the brain, usually in the heart. The clot travels through the bloodstream until it reaches an artery leading to or in the brain that's too narrow and creates a blockage. Atrial fibrillation is a common cause of embolism due to clots forming in the heart. One of these

Neurologic deficits of stroke

Neurologic deficit	Manifestation	Nursing implications/patient teaching
Visual field deficits		
Homonymous hemianopsia (loss of half of the visual field)	<ul style="list-style-type: none"> • Unaware of persons or objects on side of visual loss • Neglect of one side of the body • Difficulty judging distances 	<ul style="list-style-type: none"> • Place objects within intact visual field. • Approach patient from side of intact visual field. • Instruct/remind patient to turn head in direction of visual loss to compensate for loss of visual field.
Loss of peripheral vision	<ul style="list-style-type: none"> • Difficulty seeing at night • Unaware of objects or the borders of objects 	<ul style="list-style-type: none"> • Encourage use of eyeglasses if available. • When teaching the patient, do so within his intact visual field. • Place objects in center of patient's intact visual field
Diplopia	<ul style="list-style-type: none"> • Double vision 	<ul style="list-style-type: none"> • Explain to patient the location of an object when placing it near him. • Consistently place patient care items in the same location.
Motor deficits		
Hemiparesis	<ul style="list-style-type: none"> • Weakness of face, arm, and leg on one side due to a lesion in opposite hemisphere 	<ul style="list-style-type: none"> • Place objects within patient's reach on unaffected side. • Instruct patient to exercise and increase strength on unaffected side.
Hemiplegia	<ul style="list-style-type: none"> • Paralysis of face, arm, and leg on one side due to a lesion in opposite hemisphere 	<ul style="list-style-type: none"> • Encourage patient to provide ROM exercise to affected side. • Provide immobilization as needed to affected side. • Maintain body alignment in functional position. • Exercise unaffected limb to increase mobility, strength, use.
Ataxia	<ul style="list-style-type: none"> • Staggering, unsteady gait • Inability to keep feet together; standing requires a broad base 	<ul style="list-style-type: none"> • Support patient during initial ambulation phase. • Provide supportive device (walker, cane) for ambulation • Instruct patient not to walk without assistance or supportive device.
Dysarthria	<ul style="list-style-type: none"> • Difficulty forming words 	<ul style="list-style-type: none"> • Provide patient with alternative methods of communicating. • Allow patient sufficient time to respond to verbal communication. • Support patient and family to alleviate frustration related to difficulty in communicating.
Dysphagia	<ul style="list-style-type: none"> • Difficulty swallowing 	<ul style="list-style-type: none"> • Test patient's pharyngeal reflexes before offering food or fluids. • Assist patient with meals. • Place food on unaffected side of mouth. • Allow ample time to eat.
Sensory deficits		
Paresthesia (occurs on the side opposite the lesion)	<ul style="list-style-type: none"> • Numbness and tingling of extremity • Difficulty with proprioception (the perception of the movement and position of the limbs) 	<ul style="list-style-type: none"> • Instruct patient that sensation may be altered. • Provide ROM to affected areas and apply corrective devices as needed.
Verbal deficits		
Expressive aphasia	<ul style="list-style-type: none"> • May only be able to speak in single-word responses 	<ul style="list-style-type: none"> • Encourage patient to repeat sounds of the alphabet. • Explore patient's ability to write as an alternative means of communication.
Receptive aphasia	<ul style="list-style-type: none"> • Unable to comprehend the spoken word; can speak but may not make sense. 	<ul style="list-style-type: none"> • Speak slowly and clearly to assist patient in forming sounds. • Explore patient's ability to read as an alternative means of communication.
Global (mixed) aphasia	<ul style="list-style-type: none"> • Combination of expressive and receptive aphasia 	<ul style="list-style-type: none"> • Speak clearly and in simple sentences; use gestures or pictures when able. • Establish alternative means of communication.

clots may dislodge and travel to the brain.

Cerebral hemorrhage occurs when a defective artery in the brain

bursts and leaks blood into the brain. The sudden increase in pressure can damage brain cells in the area of leakage. If the amount of blood

increases rapidly, the resulting pressure can cause unconsciousness or death.

Causes of cerebral hemorrhage

Neurologic deficits of stroke (continued)

Neurologic deficit

Manifestation

Nursing implications/patient teaching

Cognitive deficits

- Short and long-term memory loss
 - Decreased attention span
 - Impaired ability to concentrate
 - Poor abstract reasoning
 - Altered judgment
- Frequently reorient patient to time, place, situation.
 - Use verbal and auditory cues to orient patient.
 - Provide familiar objects (family photographs, favorite objects).
 - Use simple language.
 - Match visual tasks with verbal cue; holding a toothbrush, simulate brushing of teeth while saying, "I'd like you to brush your teeth now."
 - Minimize distracting noises and view when teaching patient.
 - Frequently repeat and reinforce instructions.

Emotional deficits

- Loss of self-control
 - Emotional lability
 - Decreased tolerance to stressful situations
 - Depression
 - Withdrawal
 - Fear, hostility, anger
 - Feelings of isolation
- Support patient during uncontrollable outbursts.
 - Discuss with patient and family that outbursts are due to disease process.
 - Encourage patient to participate in group activity.
 - Provide mental stimulation for the patient.
 - Control stressful situations, if possible.
 - Provide a safe environment.
 - Encourage patient to express feelings and frustrations related to disease process.

include high BP, trauma, infection, tumor, clotting deficiencies, and blood vessel abnormalities.

Subarachnoid hemorrhage (SAH) occurs when a blood vessel on the brain's surface ruptures and quickly bleeds into the space between the brain and the skull (the subarachnoid space). An SAH usually triggers an intense headache that many stroke patients have described as "the worst they've ever had." The patient may also have neck pain, nausea, and vomiting. The buildup of pressure outside the brain can cause rapid loss of consciousness or death.

A number of risk factors may contribute to the development of SAH: high BP, alcohol abuse, oral contraceptive use, cocaine abuse, nicotine abuse, advancing age, and diagnostic procedures, such as angiography or lumbar puncture.

Aneurysms and arteriovenous malformations

Hemorrhagic strokes can be caused by diseased, abnormal, or weakened blood vessels. Blood vessel problems

that can cause hemorrhagic stroke include cerebral aneurysms and arteriovenous malformations (AVMs).

A **cerebral aneurysm** occurs when a section of a blood vessel wall weakens and balloons from the pressure of blood flowing through the vessel. This pressure further weakens the vessel wall. If untreated, the weakened wall ruptures and blood spills into the brain.

Most cerebral aneurysms are saccular, meaning they have a neck and stem. They commonly occur where arteries divide into two branches, especially in an area called the Circle of Willis (see Figure 1). That's where BP changes occur frequently and many blood vessels branch off, leaving them prone to weak spots.

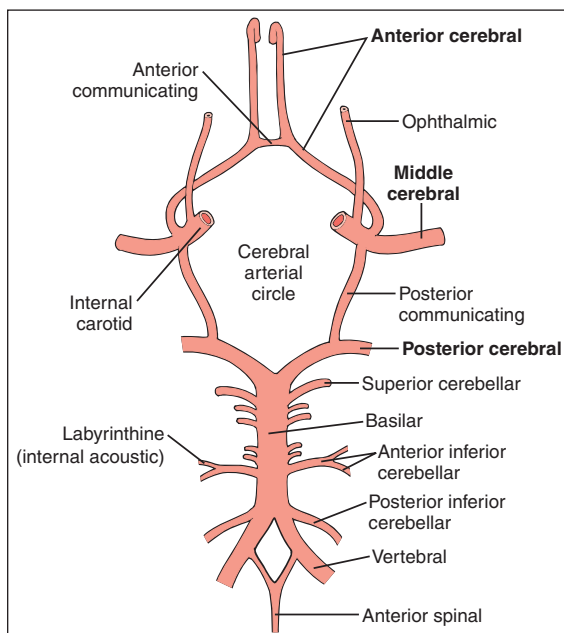


Figure 1. The cerebral arterial circle (Circle of Willis).

Cerebral aneurysms usually aren't discovered until a person develops symptoms, although some are diagnosed incidentally during magnetic resonance imaging (MRI). Symptoms include a sudden and excruciating headache, a stiff neck, and a

Stroke

By LISA HATHAWAY, RN, BSN
Clinical Editor, LPN2008

What is a stroke?

A stroke occurs when a clot or a torn blood vessel in the brain stops blood from reaching a part of the brain. Damage to that part of the brain from lack of blood and oxygen can cause various signs and symptoms of stroke, such as facial drooping, numbness, and paralysis.

Although anyone can have a stroke, your risk increases if you're male, over age 65, or have one of these conditions: high blood pressure, high cholesterol, heart disease, or diabetes. Being overweight, smoking, abusing drugs or alcohol, and taking birth control pills increase risk, too. African-Americans, people who are Hispanic or Asian, and those with a close relative who's had a stroke are also at higher risk.

How do I know if I'm having a stroke?

Signs and symptoms, which depend on the size and location of the brain injury, usually occur suddenly and may include:

- numbness or weakness of the face, arm, or leg on one side of the body
- confusion, trouble speaking or understanding
- trouble seeing from one or both eyes
- trouble walking, dizziness, or loss of balance or coordination
- severe unexplained headache.

If you have any of these problems, call 911 immediately. Don't try to drive yourself to the hospital—your symptoms could worsen while you're driving.

If you have stroke symptoms that go away after a few seconds or minutes, you may have had a ministroke (also called a warning stroke). Contact your health care provider immediately for help because a bigger stroke may be on the way.

How is a stroke treated?

Your health care provider will ask you questions about your symptoms and when they started. He'll do some tests to determine whether the stroke is caused by a blood clot (the more common type of stroke) or by bleeding in the brain. These tests may include computed tomography (CT) and magnetic resonance imaging (MRI) scans of your head. He'll also test your

blood for other problems and obtain an electroencephalogram (EEG), which records the brain's electrical activity and shows where the damage is located.

If the stroke is caused by a blood clot and you arrived at the hospital within 3 hours of when symptoms started, you may receive a drug to dissolve the clot, and another drug to thin your blood and prevent new clots. But these drugs won't be used if your stroke was caused by bleeding in your brain—that kind of stroke may require emergency surgery.

What happens after a stroke?

You may work with a physical therapist to regain muscle strength, balance, or the ability to walk. A speech therapist may evaluate how well you can eat, drink, and speak. If an arm or leg is paralyzed, an occupational therapist will help you learn how to dress yourself, bathe, and cook. Depending on how bad your stroke was, how quickly you recover, and how much help you have at home, you may be released from the hospital within 3 to 5 days. You may go to a rehabilitation center, a long-term care facility, or your home. The health care team can give you information or referrals for home care, support services, and support groups that deal with the issues facing patients and families after a stroke. You can also visit the American Stroke Association's Web site at <http://www.strokeassociation.org>.

What can I do to prevent a stroke?

If your health care provider has prescribed medicine for high blood pressure, take it as directed. Lose weight if you're overweight, exercise regularly, and eat a well-balanced diet that's low in fat, cholesterol, sugar, and salt. If you smoke, stop, and don't drink alcohol excessively. If you have diabetes, keep your blood sugar under control.

This patient-education guide has been adapted for the 5th-grade level using the Flesch-Kincaid and SMOG formulas. It may be photocopied for clinical use or adapted to meet your facility's requirements. Selected references are available upon request.

Special thanks to Tracy Kane, MEd, community health educator, Capital Health System, Trenton, N.J.

LPN2008

painful reaction to light. The patient's level of consciousness (LOC) may change. He may also experience nausea and vomiting, high BP, neurologic deficits, or seizures (see *Neurologic deficits of stroke*). Even with immediate medical care, about 35% of patients who have a cerebral aneurysm die from the initial rupture.

An *AVM* is an abnormal cluster of blood vessels in the brain. In normal blood flow, the heart pumps blood via the arteries to the brain, where it enters a network of capillaries that nourish brain tissue. Deoxygenated blood then returns to the heart via veins.

When an AVM is present, however, blood passes directly from an artery to a vein. This "short-circuit" of the normal pattern of blood flow prevents capillaries in the brain from receiving oxygenated blood. If the pressure of the draining veins builds to an abnormally high level, the weakened blood vessel walls can rupture, causing bleeding into the brain.

Warning stroke

Unlike a full-blown stroke, *transient ischemic attack* (TIA) is a "warning stroke" that occurs when the blood supply to part of the brain is briefly interrupted. A TIA can occur days, weeks, or months before a major stroke. Symptoms occur suddenly and are similar to those of a hemorrhagic stroke, but they don't last as long. Most are gone within an hour, but they may last up to 24 hours.

A patient with a TIA may describe a "veil" partly covering vision in one eye that clears up spontaneously after several minutes—a sign of temporary blockage of the retinal artery. He may also experience numbness or weakness in the face, arm, or leg, especially on one side of the body. He may feel confused or have trouble talking, understanding speech, or walking. He

may also feel dizzy or experience loss of balance and coordination.

A patient with any stroke symptoms needs urgent evaluation. About one-third of people who have a TIA eventually have acute strokes—many of which can be prevented by paying attention to TIA warning signs and treating underlying risk factors.

Evaluating the patient

When a potential stroke patient arrives at the emergency department, stabilizing his airway, breathing, and circulation is the primary concern. A brief history should follow, including the time symptoms began, any other conditions he may have (such as atrial fibrillation and high BP), and any medications he's taking, such as anticoagulants. If the patient can't define an exact time that his symptoms started, the time he was last seen to be "normal" can be used. Other important information includes any factors surrounding the onset of symptoms that might suggest something other than stroke.

A brief physical and neurologic examination includes looking for signs of trauma, abnormal bruising, evaluating for abnormal or heart sounds or irregular heart rhythms, and assessing the patient's vital signs, including his temperature and BP. The neurologic examination is brief and focused; a formal stroke score or scale, such as the National Institutes of Health Stroke Scale (NIHSS), can help in the diagnosis (see *The NIH Stroke Scale*).

Diagnostic studies recommended to evaluate someone suspected of having an acute stroke include blood glucose and electrolyte levels, complete blood cell count with platelet count, prothrombin time, activated partial thromboplastin time, international normalized ratio, and renal function studies. To evaluate the

patient's cardiovascular status, blood work should include cardiac enzymes and he should have a 12-lead electrocardiogram and cardiac monitoring. A chest X-ray isn't recommended unless he shows other signs of acute cardiac or pulmonary disease.

A noncontrast computed tomography (CT) scan of the brain, along with MRI, can provide additional information that's helpful in diagnosis and treatment. But treatment shouldn't be delayed to obtain these tests if the patient is suffering an acute stroke.

Once a patient is diagnosed with stroke, treatment should begin immediately. Let's review the options.

Treating stroke

Stroke can be treated with surgery, medications, supportive care, and rehabilitation. When plaque is blocking the carotid artery, a *carotid endarterectomy* may be performed to remove it. Another surgical technique is *cerebral angioplasty*, where balloons, stents, or coils are used to clear blockage.

The clot-dissolving drug *tissue plasminogen activator (tPA)* may be prescribed to restore blood flow to the brain. However, tPA shouldn't be used in someone with a hemorrhagic stroke, and it's effective only if given within 3 hours of the onset of stroke symptoms.

Before any surgery is considered, the patient's health care provider will request a consultation with a neurosurgeon, who'll consider the patient's age, timing of the stroke, current medical condition, and the cause, location, and mass effect of the stroke.

Your patient may need intracranial pressure (ICP) monitoring via a catheter inserted in his brain's ventricles to monitor pressure and drain cerebrospinal fluid. Normal ICP is

less than 10 mm Hg. A pressure over 20 mm Hg is considered elevated.

The goals of therapy for a patient with SAH are to reduce pain, edema, cerebral vasospasm, and vomiting and to prevent or decrease seizures. Cerebral vasospasm occurring 4 to 14 days after the initial bleed accounts for 40% to 50% of deaths related to SAH. The calcium channel blocker nimodipine (Nimotop) is given to decrease cerebral vasospasm. Seizure prevention, electrolyte management, and other interventions are needed to control ICP and maximize cerebral perfusion. Keep external stimuli to a minimum by dimming the lights and avoiding excessive noise. The patient usually undergoes surgery to repair the ruptured vessel.

Mobilizing against complications

You can take the following preventive measures to help your patient avoid complications after a stroke.

Protect the patient's airway and keep him oxygenated. Because hypoxia can worsen neurologic injury, maintaining adequate oxygenation via an effective airway is critical. Perform pulse oximetry and monitor your patient's vital signs to determine his respiratory status.

The patient may even need to be intubated. He'll probably also require rigorous pulmonary care to prevent partial airway obstruction, hypoventilation, aspiration pneumonia, and atelectasis, the most common causes of inadequate oxygenation (hypoxia) in stroke patients.

Immobility, decreased LOC, respiratory muscle deconditioning, ineffective cough, and altered breathing patterns can pose a risk of partial or total lung collapse (atelectasis) and pneumonia for your patient. Aspiration pneumonia is the most common reason for nonneurologic death dur-

ing the first month after a stroke. Pulmonary edema and pulmonary embolus can be complications of stroke, compromising oxygenation.

All stroke patients should receive supplemental oxygen on admission. Oxygen saturation (SpO₂) should be kept at least at 94%, so monitor it closely and take these steps to keep it at the right level:

- Elevate the head of the bed to 30 degrees to prevent aspiration.
- Suction secretions as needed.
- Position the patient for maximal chest expansion (frequently turning him to avoid pooling of secretions).
- Coach the patient to take deep breaths and cough to prevent atelectasis.
- Auscultate breath sounds frequently.
- Keep a sharp lookout for signs of respiratory distress.

Control his blood pressure. A key assessment when you're caring for a patient who's had a stroke is monitoring his BP. Right after the stroke, monitor BP frequently, according to facility policy. Elevated BP can result from stress, a full bladder, pain, pre-existing hypertension, hypoxia, or increased ICP. In most cases, BP declines without treatment.

The current recommendation is *not* to administer antihypertensive agents unless the patient's systolic pressure is greater than 220 mm Hg or diastolic pressure is greater than 120 mm Hg (unless he's receiving tPA).

If your patient requires medication therapy to lower BP, it should be done cautiously because lowering it too much can lead to inadequate cerebral perfusion. Expect to administer intravenous labetalol (Normodyne) or sodium nitroprusside (Nitropress) or oral captopril (Capoten) or nicardipine (Cardene). Sublingual calcium antagonists such as nifedipine (Procardia) shouldn't be used because they lower systemic BP too much to

The NIH Stroke Scale

The National Institutes of Health Stroke Scale (NIHSS) is currently the most widely used assessment tool for stroke patients. It provides a means for standardized assessment by all health care professionals. Extensive research has shown that 60% to 70% of patients with an acute ischemic stroke and a baseline NIHSS score of less than 10 will have a favorable outcome at 1 year post-stroke, while only 4% to 16% of patients with a baseline NIHSS score greater than 20 will have a favorable outcome at 1 year. The NIHSS is available online at <http://www.strokecenter.org/trials/scales/nihss.html>.

maintain cerebral perfusion.

The exception to the rule of not treating mildly elevated BP is a patient given tPA, whose BP must be carefully managed to prevent hemorrhage. In fact, tPA is contraindicated when systolic pressure is above 185 mm Hg or diastolic pressure is above 110 mm Hg.

Persistent hypotension following stroke is rare; if it occurs, it may be the result of aortic dissection, volume depletion, or decreased cardiac output.

Treat hyperthermia. Hyperthermia during the acute phase of stroke is associated with poor neurologic outcome and marked increase in morbidity and mortality. Use antipyretics (acetaminophen is the drug of choice) and cooling blankets to control hyperthermia.

Control hyperglycemia. Tight control of your patient's blood glucose level is important throughout the acute phase of stroke. Severe hypoglycemia can lead to further brain injury, and hyperglycemia is associated with poor outcomes. Hyperglycemia may be a result of the stress response to the stroke. It

may resolve spontaneously, or the patient may require insulin to maintain blood glucose levels between 80 and 110 mg/dL.

Monitor for arrhythmias. A damaged area in the brain's right hemisphere poses a high risk of cardiac arrhythmias, and atrial fibrillation is a common arrhythmia in stroke patients. Cardiac monitoring is indicated for any patient with preexisting cardiac disease or one who's had an embolic stroke. Frequently assess and document the patient's cardiac rate and rhythm, and auscultate his heart sounds. Monitor for and report a new onset of any chest pain or arrhythmia.

Look out for clotting problems. Patients with neurologic injury frequently have clotting problems. Although anticoagulant therapy following stroke is controversial, it's commonly given. If your patient is receiving parenterally administered anticoagulants, his risk of serious bleeding complications is increased.

Leg paralysis puts the patient at high risk for developing deep vein thrombosis (DVT) and subsequent pulmonary embolism. Passive range-of-motion (ROM) exercises for the paralyzed leg, early mobilization, and ambulation are essential. Use sequential pneumatic compression devices if the patient is immobile and at high risk for DVT. As ordered, administer subcutaneous unfractionated or low-molecular-weight heparin to prevent DVT. (Swelling of one leg is the most accurate sign of DVT.)

Monitor the patient for other complications, such as cerebral edema, that can lead to increased ICP, seizures, hemorrhage around the infarction, and myocardial infarction or arrhythmia. Prompt recognition and treatment are necessary to limit further damage to brain tissue.

Monitor for changes in LOC. Following stroke, changes in the

patient's LOC usually indicate a developing complication. The earlier a change is recognized and the cause treated, the less chance of additional morbidity and mortality. Even slight changes such as sleepiness or confusion in the early stages of stroke can indicate increasing ICP. Report such changes immediately.

Manage your patient's pain. Many problems can cause pain after a stroke, including poor positioning, central neurologic impairment, limited mobility, pressure ulcers, and infection. Your patient may receive an opioid such as codeine or a non-narcotic medication such as acetaminophen to manage pain. If he's able to respond, frequently ask him about pain using a validated pain rating scale. If he can't respond, look for nonverbal cues, like grimacing, resisting movement, or withdrawing.

Reposition the patient frequently. Besides helping prevent DVT, ROM exercises and early ambulation keep joints moving. Reposition the patient frequently and use pillows, wedges, and pressure-reducing mattresses or surfaces to better distribute weight. Pressure ulcers are a complication of stroke recovery. Assess your patient's skin with each nursing assessment, paying close attention to his sacrum area and heels, which are most vulnerable to pressure ulcers.

Control incontinence. Urinary and fecal incontinence are fairly common following stroke and can lead to tissue breakdown and pressure ulcer development. Effective management includes correcting incontinence when possible, using pads or briefs that wick moisture away from the skin, using moisture-barrier creams, frequent changing and cleansing, and frequent assessment of the skin for maceration and yeast infections.

Monitor your patient's urine output and assess for a distended bladder as appropriate. Urine retention

can increase the risk for urinary tract infection.

Prevent infection. A stroke patient is at high risk for health care-acquired infections. Invasive devices, urinary catheters, pressure ulcers, respiratory insufficiency, and metabolic changes all increase infection risk. To lower the risk, change invasive lines according to facility protocol, and discontinue urinary catheters as soon as possible. Prevent skin breakdown, encourage deep breathing and coughing to prevent atelectasis, and use standard precautions to decrease infection risk.

Looking at both sides

Symmetry describes the similarity of the sides of the body affected and unaffected by stroke. Make a baseline comparison to gather details about deficits on your patient's affected side. Continued comparisons help in assessing and documenting improvements. A marked decrease in symmetry after baseline measurement indicates a developing complication or recurrent stroke.

Neurologic impairment in the muscles on the affected side of the body can result in rapid deconditioning. Consult physical therapy on admission to begin planning an early ambulation program. Use appropriate assistive devices to mobilize the patient. If he can't walk, maintain frequent ROM exercises.

A stroke may cause your patient to lose awareness of the affected side of his body. Besides not using this side, he may not even be aware it exists. When severe, this problem can lead to "one-side neglect." Interventions to help improve awareness of the neglected side include approaching the patient from that side, placing the night stand with the TV remote and water carafe on that side, and including the neglected hand in daily care activities. Make sure the call

button stays on his unaffected side.

For about a month after someone has a stroke, seizure precautions should be implemented and the patient should be closely monitored. If he develops seizures, fosphenytoin (Cerebyx) and phenytoin (Dilantin) are the preferred anti-seizure medications.

Hard to swallow

For various reasons, a patient can become dehydrated and malnourished after a stroke. Changes in consciousness, inability to swallow, excess antidiuretic hormone release that causes fluid overload, diabetes insipidus that causes fluid deficit, and inadequate nutrition can be underlying problems. Lab tests to assess nutritional status, serum electrolytes, and serum osmolarity will help to identify reversible causes.

Half of stroke patients experience dysphagia, so your patient may need dietary modifications to maintain nutrition. Poor nutrition increases your patient's risk for pressure ulcers. Studies also show that poor baseline nutritional status is associated with a worse outcome at 6 months following stroke.

If your patient's having difficulty with liquids or food, request a consult with a speech pathologist to obtain a swallowing study. Ensure proper nutrition through enteral or parenteral routes; feeding tubes may be needed on a temporary or permanent basis.

Carefully monitor your patient's intake and output. Tachycardia may be an indication of hypovolemia. Crackles in the lungs or edema can indicate hypervolemia.

On the edge

Because stroke greatly increases a patient's risk for falls, implement fall precautions (including bed alarms), and make sure your patient's call

button is within easy reach. He may have trouble walking, so make sure that sufficient staff are available to help him and that he uses appropriate assistive devices for ambulation.

Anosognosia, the inability to acknowledge physical impairments from a stroke, may affect your patient, giving him a false sense of security and increasing his risk of injury. A bed alarm may be needed to prevent the patient from getting out of bed unattended. Family members or professional sitters may be required around-the-clock to protect him from injury.

About two-thirds of stroke patients develop *spasticity* in which certain muscles are continuously contracted, causing stiffness or tightness that may interfere with movement, speech, and ambulation. The cause is usually damage to the portion of the brain that controls voluntary movement. Drugs most frequently used to manage generalized spasticity include tizanidine (Zanaflex), baclofen (Lioresal), diazepam (Valium), and dantrolene (Dantrium). Physical therapy often helps too. For certain patients, surgery to cut or transfer tendons may be necessary to relieve spasticity. Monitor your patient's response to medications, assess his functional ability, and maintain joint mobility.

Debilitating deficits

A stroke can dramatically shorten your patient's attention span. Or he may develop apraxia, the loss of ability to execute or carry out skilled movements and gestures, despite having the desire and the physical ability to do them.

To accommodate these deficits, divide your patient teaching into short segments. Short-term memory loss is common too, so reinforcement is necessary. The patient may ask the same question over and over; give him the same simple answer each time.

About one-quarter of stroke patients are affected by some type of aphasia, making communication difficult. Aphasia can partially or completely affect his ability to understand spoken words and to speak, read, write, or add and subtract. Only about half of stroke patients affected by aphasia regain language skills within a year. Consult a speech therapist as soon as aphasia becomes evident.

When caring for a patient with aphasia, speak slowly and clearly, use hand gestures, and encourage the patient to use hand gestures to convey thoughts if you can't understand what he's saying. Minimize loud noises when trying to communicate, and focus on his remaining abilities. Patience and understanding are essential.

Emotional lability is common after stroke. Because feelings evoked by such a catastrophe include fear, anxiety, frustration, anger, sadness, and grief, a mental health professional should be involved in the patient's treatment.

Clinical depression affects up to half of stroke patients and can arise at any time after a stroke. It can complicate rehabilitation, limit progress, and negatively impact mental functioning. Monitor your patient for symptoms of depression, and report them promptly. Antidepressants, typically selective serotonin reuptake inhibitors, are typically used to treat poststroke depression.

Ongoing care

Stroke is a catastrophic, sudden event that can have a dire effect on your patient's circle of family and friends. If he's the family's primary breadwinner, a financial crisis is added to the health crisis. A case manager or social worker should begin working with the patient and the family at admission to help them cope with crises, assess their

need for community services, serve as a liaison to the support services, and help put together a realistic and appropriate discharge plan.

Rehabilitation after a stroke focuses on improving the patient's function and quality of life. Post-stroke care can be provided in inpatient rehabilitation units, outpatient units, skilled nursing facilities, or at home. A multidisciplinary team should include rehabilitation providers and nurses; physical, occupational, and recreational therapists; speech-language pathologists; vocational therapists; mental health professionals; and social workers.

When a patient is discharged home, caregiver burnout is a risk. Frequently, a caregiver spouse or partner has her own health problems and is unprepared for the stresses of caregiving. Community support groups for both stroke patients and caregivers exist in most large cities and on the Internet.

Beyond clinical support

Even with prompt and effective treatment, many patients who've

had a stroke require some level of rehabilitation, and some require long-term care. Your patient and his family need extensive education and emotional support. They may not completely understand what's happened or how it'll affect their daily lives. Make full use of your facility's counseling resources to be sure they have the help they need to cope with life changes that accompany stroke.

Caring for a patient with a stroke can be extremely challenging—but it can be equally rewarding. With vigilance, frequent assessment, patience, and compassion, you can help your patient along the road to recovery. **LPN**

Selected references

American Heart Association. Stroke. <http://www.americanheart.org/presenter.jhtml?identifier=>

1498. Accessed February 11, 2008.

Assessment Made Incredibly Easy!, 4th edition. Philadelphia, Pa., Lippincott Williams & Williams, 2008.

Baldwin KM. Stroke: It's a knock-out punch. *Nursing Made Incredibly Easy!* 4(2):10-23, March/April 2006.

Cohn JL, Powers J. Are you ready to manage patients with acute ischemic stroke? *LPN* 2005. 1(4):14-26, July/August 2005.

Framingham Heart Study. <http://www.nhlbi.nih.gov/about/framingham>. Accessed February 15, 2008.

Granitto M, Galitz D. Update on stroke: The latest guidelines. *The Nurse Practitioner*. 33(1):39-46, January 2008.

Internet Stroke Center. About stroke. <http://www.strokecenter.org/patients/stats.htm>. Accessed February 11, 2008.

Porth CM. *Essentials of Pathophysiology: Concepts of Altered Health States*, 2nd edition. Philadelphia, Pa., Lippincott Williams & Wilkins, 2006.

Reddy LS. Heads up on cerebral bleeds. *Nursing Made Incredibly Easy!* 2(3):8-16, May/June 2004.

Smeltzer SC, et al. *Brunner & Suddarth's Textbook of Medical-Surgical Nursing*, 11th edition. Philadelphia, Pa., Lippincott Williams & Wilkins, 2007.



On the Web

American Association of Neuroscience Nurses: <http://www.aann.org>

American Stroke Association: <http://www.strokeassociation.org>

Brain Attack Coalition: <http://www.stroke-site.org>

National Institute of Neurological Disorders and Stroke: <http://www.ninds.nih.gov>

National Stroke Association: <http://www.stroke.org>

CE CONNECTION

Earn CE credit online:

Go to <http://www.nursingcenter.com/ce/lpn> and receive a certificate *within minutes*.

INSTRUCTIONS

Stroke: An all-out assault on the brain

TEST INSTRUCTIONS

- To take the test online, go to our secure Web site at <http://www.nursingcenter.com/ce/lpn>.
- On the print form, record your answers in the test answer section of the CE enrollment form on page 46. Each question has only one correct answer. You may make copies of these forms.
- Complete the registration information and course evaluation. Mail the completed form and registration fee of \$24.95 to: **Lippincott Williams & Wilkins, CE Group**, 2710 Yorktowne Blvd., Brick, NJ 08723. We will mail your certificate in 4 to 6 weeks. For faster service, include a fax number and we will fax your certificate within 2 business days of receiving your enrollment form.
- You will receive your CE certificate of earned contact hours and an answer key to review your results. There is no minimum passing grade.
- Registration deadline is June 30, 2010.

DISCOUNTS and CUSTOMER SERVICE

- Send two or more tests in any nursing journal published by Lippincott Williams & Wilkins together and deduct \$0.95 from the price of each test.
- We also offer CE accounts for hospitals and other health care facilities on nursingcenter.com. Call **1-800-787-8985** for details.

PROVIDER ACCREDITATION

Lippincott Williams & Wilkins, publisher of *LPN* 2008, will award 2.5 contact hours for this continuing nursing education activity.

Lippincott Williams & Wilkins is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.

Lippincott Williams & Wilkins is also an approved provider of continuing nursing education by the American Association of Critical-Care Nurses #00012278 (CERP category A), District of Columbia, Florida #FBN2454, and Iowa #75. Lippincott Williams & Wilkins home study activities are classified for Texas nursing continuing education requirements as Type 1. This activity is also provider approved by the California Board of Registered Nursing, Provider Number CEP 11749, for 2.5 contact hours.

Your certificate is valid in all states.

Stroke: An all-out assault on the brain

GENERAL PURPOSE: To provide the nurse with an overview of the pathology and intervention strategies of stroke. **LEARNING OBJECTIVES:** After reading the preceding article and taking this test, you should be able to: **1.** Differentiate the types of stroke, their pathology and symptomatology. **2.** Describe treatment and therapeutic nursing interventions for stroke and its complications.

- 1. Eighty-seven percent of all strokes are caused by**
 - a. subarachnoid hemorrhage (SAH).
 - b. cerebral hemorrhage.
 - c. cerebral thrombosis and cerebral embolism.
 - d. an aneurysm.
- 2. One common cause of a cerebral embolism is**
 - a. low blood pressure.
 - b. atrial fibrillation.
 - c. tumor.
 - d. infection.
- 3. A defective artery in the brain that bursts and leaks blood into the brain results in a**
 - a. cerebral thrombosis.
 - b. cerebral embolism.
 - c. cerebral hemorrhage.
 - d. SAH.
- 4. Which type of stroke triggers an intense headache often described as the worst ever experienced?**
 - a. cerebral thrombosis
 - b. cerebral embolism
 - c. cerebral hemorrhage
 - d. SAH
- 5. All of the following may be symptoms of cerebral aneurysm except**
 - a. tinnitus (ringing in the ear).
 - b. stiff neck.
 - c. a sudden and excruciating headache.
 - d. a change in the patient's level of consciousness.
- 6. Which statement about transient ischemic attack (TIA) is true?**
 - a. It occurs when the blood supply to part of the brain is permanently interrupted.
 - b. It can occur days, weeks, or months only after a major stroke.
 - c. Its symptoms occur suddenly and are similar to those of a hemorrhagic stroke, but they are of shorter duration.
 - d. A few symptoms may last up to 6 months or longer.
- 7. Patient history and diagnostic tests needed in the treatment of stroke include each of the following except**
 - a. anticoagulation status.
 - b. determination of when the symptoms started.
 - c. liver function studies.
 - d. electrocardiogram and cardiac enzymes.
- 8. Unilateral weakness due to a lesion in the opposite brain hemisphere is known as**
 - a. hemiparesis.
 - b. hemiplegia.
 - c. ataxia.
 - d. paresthesia.
- 9. Using the National Institutes of Health Stroke Scale, most stroke patients with a baseline score of less than 10 will have**
 - a. a favorable outcome within 3 to 6 hours poststroke.
 - b. a favorable outcome at 1 year poststroke.
 - c. motor and sensory deficits lasting 5 to 10 years poststroke.
 - d. permanent motor deficits poststroke.
- 10. Tissue plasminogen activator (tPA) would most likely be prescribed for the patient with**
 - a. hemorrhagic stroke.
 - b. TIA.
 - c. cerebral embolism.
 - d. cerebral thrombosis of 5 hours duration.
- 11. Which complication occurs 4 to 14 days after SAH and accounts for 40% to 50% of deaths?**
 - a. clots forming in the heart
 - b. cerebral vasospasm
 - c. atrial fibrillation
 - d. anosognosia
- 12. Which of the following interventions for the stroke patient is incorrect?**
 - a. Administer oxygen.
 - b. Perform pulse oximetry and monitor vital signs.
 - c. Maintain oxygen saturation (SpO₂) at 94% or higher.
 - d. Maintain a flat supine position.
- 13. The most common cause of nonneurologic death in the first month after stroke is**
 - a. aspiration pneumonia.
 - b. cardiac arrhythmias.
 - c. pulmonary embolus.
 - d. renal failure.
- 14. Which blood pressure reading in a stroke patient not on tPA would require medical intervention?**
 - a. 180/90
 - b. 190/100
 - c. 200/125
 - d. 210/115
- 15. Which statement about poststroke monitoring and care is correct?**
 - a. Sleepiness or confusion may signal reperfusion of a blocked cerebral artery.
 - b. Passive range of motion exercises should not be attempted without a physician order.
 - c. Stroke patients have no cause for experiencing pain during recovery.
 - d. Blood glucose may become elevated due to stress.
- 16. What's the most accurate sign of deep vein thrombosis after stroke?**
 - a. hemiplegia
 - b. swelling of one leg
 - c. ataxia
 - d. leg pain
- 17. For the patient with one-sided neglect, improving awareness of the affected side can best be accomplished by**
 - a. placing the call bell on the affected side.
 - b. placing the TV control on the unaffected side.
 - c. approaching the patient from the affected side.
 - d. speaking slowly and using hand signals.
- 18. To support the patient's emotional deficits, all of the following are recommended except**
 - a. gently reprimand the patient for emotional outbursts.
 - b. encourage the patient to express his feelings and frustrations.
 - c. encourage the patient to participate in mental stimulation activities.
 - d. control stressful situations if possible.



ENROLLMENT FORM LPN2008, May/June, Stroke: An all-out assault on the brain

A. Registration Information:

Last name _____ First name _____ MI _____
 Address _____
 City _____ State _____ ZIP _____
 Telephone _____ Fax _____ E-mail _____

LPN RN CNS NP CRNA CNM other _____
 Job title _____ Specialty _____
 Type of facility _____ Are you certified? Yes No
 Certified by _____
 State of license (1) _____ License # _____
 State of license (2) _____ License # _____
 From time to time, we make our mailing list available to outside organizations to announce special offers. Please check here if you do not wish us to release your name and address.
 Please fax my certificate to me.

Registration Deadline: June 30, 2010
 Contact hours: 2.5 Pharmacology hours: 0.0 Fee: \$24.95

B. Test Answers: Darken one circle for your answer to each question.

- | | | | |
|--|---|---|---|
| <ol style="list-style-type: none"> 1. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d 2. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d 3. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d 4. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d 5. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d | <ol style="list-style-type: none"> 6. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d 7. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d 8. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d 9. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d 10. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d | <ol style="list-style-type: none"> 11. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d 12. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d 13. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d 14. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d 15. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d | <ol style="list-style-type: none"> 16. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d 17. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d 18. <input type="radio"/> a <input type="radio"/> b <input type="radio"/> c <input type="radio"/> d |
|--|---|---|---|

C. Course Evaluation*

1. Did this CE activity's learning objectives relate to its general purpose? Yes No
2. Was the journal home study format an effective way to present the material? Yes No
3. Was the content relevant to your nursing practice? Yes No
4. How long did it take you to complete this CE activity? _____ hours _____ minutes
5. Suggestion for future topics _____

D. Two Easy Ways to Pay:

- Check or money order enclosed (Payable to Lippincott Williams & Wilkins)
 Charge my Mastercard Visa American Express
 Card # _____ Exp. date _____
 Signature _____

*In accordance with the Iowa Board of Nursing administrative rules governing grievances, a copy of your evaluation of the CE offering may be submitted directly to the Iowa Board of Nursing.