

Stroke

Strokes, also known as cerebrovascular accidents or brain attacks, involve a disruption in the cerebral blood flow secondary to ischemia, hemorrhage, brain attack, or embolism.

Classifications of strokes are hemorrhagic and ischemic. (Ischemic strokes are thrombotic or embolic.)

Hemorrhagic occur secondary to a ruptured artery or aneurysm. The prognosis for a client who has experienced a hemorrhagic stroke is poor due to the amount of ischemia and increased ICP caused by the expanding collection of blood. If it is caught early and evacuation of the clot can be done with cessation of the active bleed, the prognosis of a hemorrhagic stroke improves significantly. (15.1)

Thrombotic is an ischemic stroke that occurs secondary to the development of a blood clot on an atherosclerotic plaque in a cerebral artery

that gradually shuts off the artery and causes ischemia distal to the occlusion. Manifestations of a thrombotic stroke evolve over a period of several hours to days. (15.2)

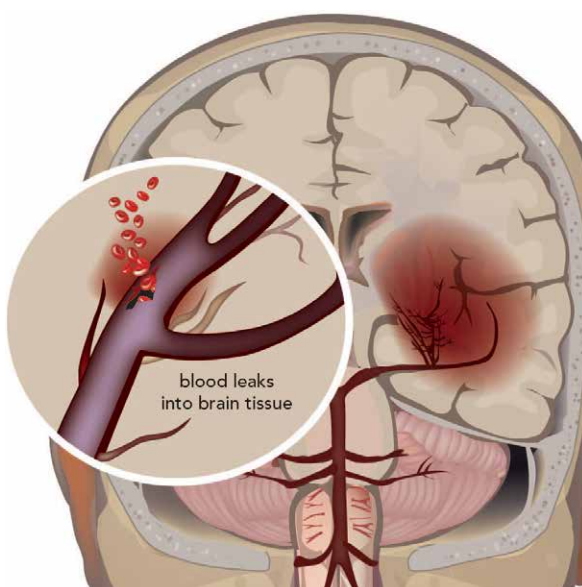
Embolic is an ischemic stroke caused by an embolus traveling from another part of the body to a cerebral artery. Blood to the brain distal to the occlusion is immediately shut off causing neurologic deficits or a loss of consciousness to instantly occur. (15.3)

Ischemic strokes (thrombotic or embolic) can be reversed with fibrinolytic therapy using alteplase, also known as tissue plasminogen activator (tPA), if given within 3 to 4.5 hr of the initial symptoms (unless contraindicated by factors such as presence of active bleeding).

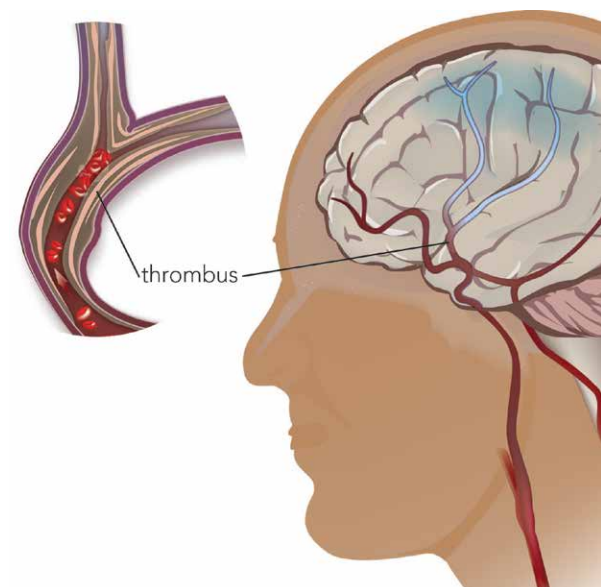
HEALTH PROMOTION AND DISEASE PREVENTION

- Hypertension, diabetes mellitus, smoking, and other related disorders can increase a client's risk for a stroke. **QEBP**
- Early treatment of hypertension, maintenance of blood glucose within expected range, and refraining from smoking will decrease these risk factors.
- Maintaining a healthy weight and getting regular exercise can also decrease the risk of a stroke.

15.1 Hemorrhagic stroke



15.2 Thrombotic stroke



ASSESSMENT

RISK FACTORS

- Cerebral aneurysm
- Arteriovenous malformation (AV)
- Diabetes mellitus
- Obesity
- Hypertension
- Atherosclerosis
- Hyperlipidemia
- Hypercoagulability
- Atrial fibrillation
- Use of oral contraceptives
- Smoking
- Cocaine use

EXPECTED FINDINGS

Some clients report transient manifestations, such as visual disturbances, dizziness, slurred speech, and a weak extremity.

- These manifestations can indicate a transient ischemic attack (TIA), which can be a warning of an impending stroke.
- Antithrombotic medication and/or surgical removal of atherosclerotic plaques in the carotid artery can prevent the subsequent occurrence of a stroke.

PHYSICAL ASSESSMENT FINDINGS

Manifestations vary based on the area of the brain that is deprived of oxygenated blood.

- **The left cerebral hemisphere** is responsible for language, mathematics skills, and analytic thinking.
 - Expressive and receptive aphasia (inability to speak and understand language)
 - Agnosia (unable to recognize familiar objects)
 - Alexia (reading difficulty)
 - Agraphia (writing difficulty)
 - Right extremity hemiplegia (paralysis) or hemiparesis (weakness)

- Slow, cautious behavior
- Depression, anger, and quick to become frustrated
- Visual changes, such as hemianopsia (loss of visual field in one or both eyes)
- **The right cerebral hemisphere** is responsible for visual and spatial awareness and proprioception. **Qs**
 - Altered perception of deficits (overestimation of abilities)
 - Unilateral neglect syndrome (ignore left side of the body: cannot see, feel, or move affected side, so client unaware of its existence). Can occur with left-hemispheric strokes, but is more common with right-hemispheric strokes.
 - Loss of depth perception
 - Poor impulse control and judgment
 - Left hemiplegia or hemiparesis
 - Visual changes, such as hemianopsia

DIAGNOSTIC PROCEDURES

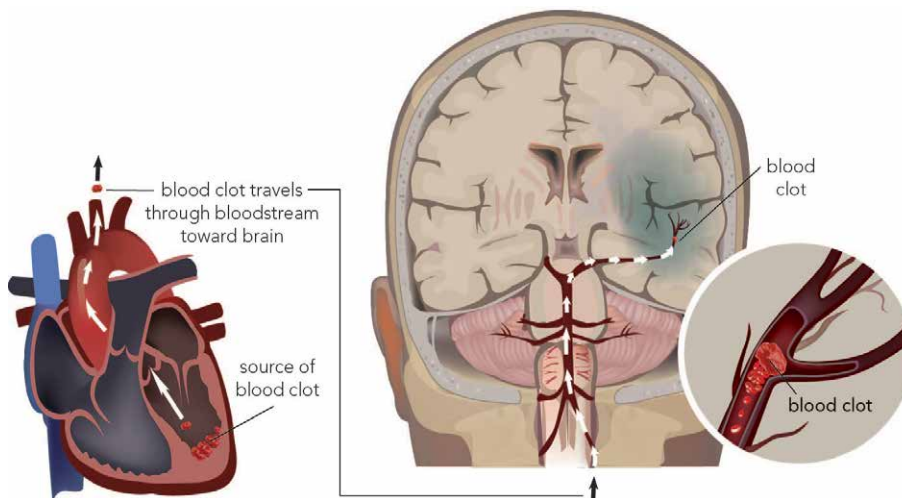
A magnetic resonance imaging (MRI), computed tomography (CT) imaging, and/or a computed axial tomography (CAT) scan can be used to identify edema, ischemia, and necrosis.

A magnetic resonance angiography or a cerebral angiography are used to identify the presence of a cerebral hemorrhage, abnormal vessel structures (AV malformation, aneurysms), vessel ruptures, and regional perfusion of blood flow in the carotid arteries and brain.

A lumbar puncture is used to assess for the presence of blood in the cerebrospinal fluid. A positive finding is consistent with a cerebral hemorrhage or ruptured aneurysm.

The Glasgow Coma Scale is used when the client has a decreased level of consciousness or orientation. The risk for increased intracranial pressure (ICP) exists related to the swelling of the brain that can occur secondary to ischemic insult.

15.3 Embolic stroke



15.4 Communication board



NURSING CARE

- Monitor vital signs every 1 to 2 hr. Notify the provider immediately if blood pressure exceeds a systolic greater than 180 mm Hg or a diastolic greater than 110 mm Hg. This can indicate the client is experiencing an ischemic stroke. **Qs**
- Monitor the client's temperature. A fever can cause an increase in intracranial pressure.
- Provide oxygen therapy to maintain oxygen saturation level greater than 92%, or if the client's level of consciousness is decreased.
- Place the client on a cardiac monitor to detect arrhythmias.
- Conduct a cardiac assessment, and auscultate apical heart rate to detect murmurs or irregularity.
- Monitor for changes in level of consciousness (increased ICP sign).
- Monitor vital signs, electrocardiogram.
- Elevate the head of the bed approximately 30° to reduce ICP and to promote venous drainage. Avoid extreme flexion or extension of the neck, and maintain the client's head in the midline neutral position. **QEBP**
- Institute seizure precautions.
- Assist with the client's communication skills if speech is impaired. **(15.4)**
 - Assess the ability to understand speech by asking the client to follow simple commands.
 - Observe for consistently affirmative answers when the client actually does not comprehend what is being said.
 - Assess accuracy of yes/no responses in relation to closed-ended questions.
 - Supply the client with a picture board of commonly requested items/needs.
 - For expressive and receptive aphasia speak slowly and clearly, use one-step commands.
- Assist with safe feeding. **Qs**
 - Assess swallowing and gag reflexes before feeding. The speech-language pathologist (SLP) may request a swallowing study that can involve swallowing a barium substrate and radiography of the peristaltic activity of the esophagus.
 - Four liquid consistencies have been identified by a collaborative group of specialists for clients who have dysphagia: thin (water, juice), nectar-like (cream soups, nectars), honey-like (honey, yogurt), and spoon-thick (pudding, cooked cereals). Food levels for dysphagia include pureed, mechanically altered, advanced/mechanically soft, and regular. Use the appropriate consistency and food type as recommended by the SLP to minimize choking.
 - Have the client eat in an upright position and swallow with the head and neck flexed slightly forward.
 - Place food in the back of the mouth on the unaffected side.
 - Have suction on standby.
 - Maintain a distraction-free environment during meals.
 - Collaborate with dietitian to ensure appropriate caloric intake, because weight loss is common following stroke. **QTC**
- Prevent complications of immobility, such as atelectasis, pneumonia, pressure sores, and deep-vein thrombosis (DVT). Clients who have experienced strokes are ambulated as soon as possible to prevent complications. However, during periods of inactivity, preventive measures related to complications of immobility should be implemented.
- Maintain skin integrity.
 - Reposition the client frequently and use padding.
 - Monitor bony prominences, paying particular attention to the affected extremities.
 - If the client has one-sided neglect, teach him to protect and care for the affected extremity to avoid injuring it in the wheel of the wheelchair or hitting/smashing it against a doorway.
- Encourage passive range of motion every 2 hr to the affected extremities and active range of motion every 2 hr to the unaffected extremities. Teach the client how to use the unaffected side to exercise the affected side of the body.
- Elevate affected extremities to promote venous return and reduce swelling. An elastic glove can be placed on the affected hand if swelling is severe. Teach the client to massage the affected hand by stroking it in a distal to proximal manner, encouraging fluid in the hand to move back into the wrist and arm.
- Maintain a safe environment to reduce the risk of falls. Assistive devices, such as transfer belts and sliding boards, should be used during transfers. Sit-to-stand lifts can also facilitate transfers and reduce strain on the care provider's body. **Qs**
- If the client has homonymous hemianopsia (loss of the same visual field in both eyes), instruct him to use a scanning technique (turning head from the direction of the unaffected side to the affected side) when eating and ambulating.
- To prevent DVT, provide preventive measures such as sequential compression stockings, frequent position changes, and mobilization.
- Provide assistance with ADLs as needed. Instruct the client to dress the affected side first and sit in a supportive chair that aids in balance. Have occupational therapy assess the client for adaptive aids, such as a plate guard, utensils with built-up handles, a reaching tool to pick things up, and shirts and shoes that have hook and loop fasteners or tape instead of buttons and ties.
- Clients who have experienced strokes have decreased endurance and impaired balance due to paralysis on one side of the body. Provide frequent rest periods from sitting in the wheelchair by returning the client to bed after therapies and meals. When sitting the client up in bed or in the wheelchair, leaning to the affected side typically occurs and should be countered with some manner of support.
- Shoulder subluxation can occur if the affected arm is not supported. The weight of the arm is such that it can cause a painful dislocation of the shoulder from its socket. Support the arm while in bed, the wheelchair, or during ambulation with an arm sling or strategically placed pillows.
- Support the client during periods of emotional lability and depression. **Qpcc**

MEDICATIONS

Anticoagulants (heparin sodium, enoxaparin, warfarin): Use of anticoagulants is controversial and not recommended due to the high risk of intracerebral bleeding.

Antiplatelets (aspirin)

- Low-dose aspirin is given within 24 to 48 hr following a stroke to prevent further clot formation.
- Other antiplatelets, such as clopidogrel, are not recommended.

Thrombolytic medications reteplase recombinant: Give within 4.5 hr of initial symptoms.

Antiepileptic medications (phenytoin, gabapentin)

- These medications are not commonly given following a stroke unless the client develops seizures.
- Gabapentin can be given for paresthetic pain in an affected extremity.

THERAPEUTIC PROCEDURES

Systemic or catheter-directed thrombolytic therapy restores cerebral blood flow. It must be administered within 6 hr of the onset of symptoms. It is contraindicated for treatment of a hemorrhagic stroke and for clients who have an increased risk of bleeding due to anticoagulant therapy or other bleeding anomaly. Possibility of hemorrhagic stroke is ruled out with an MRI prior to the initiation of thrombolytic therapy.

- Carotid artery angioplasty with stenting (CAS) involves inserting a catheter in the femoral artery and placing a distal/embolic protection device to catch clot debris during the procedure while a stent is being placed in the carotid artery to open a blockage. CAS is less invasive, blood loss is decreased, and length of hospitalization is shorter. Postoperative care is the same as carotid endarterectomy.
- Carotid endarterectomy is performed to open the artery by removing atherosclerotic plaque. This procedure is performed when the carotid artery is blocked or when the client is experiencing TIAs.
- Assess for increased headache, neck swelling, and hoarseness of the throat.
- Extracranial-intracranial bypass is a craniotomy performed to improve cerebral perfusion following a stroke or for clients who have had a TIA that is likely to progress to a stroke. It increases blood flow around blocked artery and can help restore blood flow to affected areas of the brain.

INTERPROFESSIONAL CARE

- Speech and language therapists can be consulted for language therapy and swallowing exercises.
- Physical therapy can be consulted for assistance with reestablishment of ambulation with or without assistive devices (single or quad cane, walker) or wheelchair support. Wheelchair adaptations, such as an extended brake handle on the client's affected side of the wheelchair, can be necessary. Safety features, such as placing the brakes on when preparing to transfer and the use of a cushion on the seat, may also be initiated by physical therapy.
- Occupational therapy can be consulted for assistance with reestablishment of partial or full function of the affected hand and arm. If function does not return to the extremity, measures such as massage and elastic gloves will be prescribed by occupational therapy to prevent swelling of the extremity.
- Social services can be consulted to make arrangements for rehabilitation services and temporary placement on a skilled rehabilitation unit or extended-care facility during provision of these services. Prior to discharge, the social worker may make a home visit with selected therapists and nurses to evaluate the need for environmental alterations in the home and adaptive equipment needed for ADLs.

COMPLICATIONS

Dysphagia and aspiration

- Dysphagia can result from neurological involvement of the cranial nerves that innervate the face, tongue, soft palate, and throat. As a result, the client's risk of aspiration is great. **Qs**
- Not all clients who have experienced a stroke have dysphagia, but all should be evaluated prior to reestablishing oral nutrition and hydration.

NURSING ACTIONS

- Assess gag reflex. If the gag reflex is present, give the client a small sip of water to determine if choking occurs.
- If the client exhibits difficulty managing food or fluids, a swallowing evaluation should be done by an SLP. **Qtc**
- Keep the client completely NPO until evaluated by the SLP.
- Begin the client with the prescribed liquid-consistency regimen from the National Dysphagia Diet and observe closely for choking. Have suction equipment available, but feed with care because nasotracheal suctioning increases ICP. **QEBP**
- Initial feedings should be done by an RN, so appropriate interventions can be taken if choking occurs. Some clients require an eating environment without distractions to prevent choking.

CLIENT EDUCATION

- Teach the client's family strategies for eating and give instructions regarding prescribed consistency of liquids and solid foods.
- Instruct the client to sit upright and to flex his head forward when swallowing to decrease the risk of choking. **Qs**

Unilateral neglect

Unilateral neglect is the loss of awareness of the side affected by the stroke. The client cannot see, feel, or move the affected side of his body; therefore, he forgets that it exists. This lack of awareness poses a great risk for injury to the neglected extremities and creates a self-care deficit.

NURSING ACTIONS

- Observe affected extremities for injury (bruises and abrasions of the affected hand and arm, hyperflexion of the foot from it falling off of the wheelchair during transport).
- Apply an arm sling if the client is unable to remember to care for the affected extremity.
- Ensure that the foot rest is on the wheelchair and that an ankle brace is on the affected foot.

CLIENT EDUCATION

- Instruct the client to dress the affected side first. **Qecc**
- Teach the client how to care for the affected side.
- Use the unaffected hand to pull the affected extremity to midline and out of danger from the wheel of the wheelchair or from hitting or smashing it against a doorway.
- Teach the client to look over the affected side periodically.

PRACTICE Active Learning Scenario

A nurse is caring for a client who has dysphagia. Use the ATI Active Learning Template: Nursing Skill to complete this item.

NURSING INTERVENTIONS: List three nursing actions the nurse should include while caring for this client.

Application Exercises

1. A nurse is caring for a client who has experienced a right-hemispheric stroke. Which of the following are expected findings? (Select all that apply.)
 - A. Impulse control difficulty
 - B. Left hemiplegia
 - C. Loss of depth perception
 - D. Aphasia
 - E. Lack of situational awareness
2. A nurse is caring for a client who has left homonymous hemianopsia. Which of the following is an appropriate nursing intervention?
 - A. Teach the client to scan to the right to see objects on the right side of her body.
 - B. Place the bedside table on the right side of the bed.
 - C. Orient the client to the food on her plate using the clock method.
 - D. Place the wheelchair on the client's left side.
3. A nurse is planning care for a client who has dysphagia and a new dietary prescription. Which of the following should the nurse include in the plan of care? (Select all that apply.)
 - A. Have suction equipment available for use.
 - B. Feed the client thickened liquids.
 - C. Place food on the unaffected side of the client's mouth.
 - D. Assign an assistive personnel to feed the client slowly.
 - E. Teach the client to swallow with her neck flexed.
4. A nurse is caring for a client who has global aphasia (both receptive and expressive). Which of the following should the nurse include in the client's plan of care? (Select all that apply.)
 - A. Speak to the client at a slower rate.
 - B. Assist the client to use flash cards with pictures.
 - C. Speak to the client in a loud voice.
 - D. Complete sentences that the client cannot finish.
 - E. Give instructions one step at a time.
5. A nurse is assessing a client who has experienced a left-hemispheric stroke. Which of the following is an expected finding?
 - A. Impulse control difficulty
 - B. Poor judgment
 - C. Inability to recognize familiar objects
 - D. Loss of depth perception

Application Exercises Key

1. A. **CORRECT:** A client who has experienced a right-hemispheric stroke will exhibit impulse control difficulty, such as the urgency to use the restroom.
B. **CORRECT:** A client who has experienced a right-hemispheric stroke will exhibit left-sided hemiplegia.
C. **CORRECT:** A client who has experienced a right-hemispheric stroke will experience a loss in depth perception.
D. A client who has experienced a left-hemispheric stroke will experience aphasia.
E. **CORRECT:** A client who has experienced a right-hemispheric stroke will demonstrate a lack of awareness of surroundings.
NCLEX® Connection: Physiological Adaptation, Pathophysiology
2. A. A client who has left homonymous hemianopsia has lost the left visual field of both eyes. The client should be taught to turn his head to the left to visualize the entire field of vision.
B. **CORRECT:** The client is unable to visualize to the left midline of her body. Placing the bedside table on the right side of the client's bed will permit visualization of items on the table.
C. Using the clock method of food placement will be ineffective because only half of the plate can be seen.
D. The wheelchair should be placed to the client's right or unaffected side.
NCLEX® Connection: Physiological Adaptation, Illness Management
3. A. **CORRECT:** Suction equipment should be available in case of choking and aspiration.
B. **CORRECT:** The client should be given liquids that are thicker than water to prevent aspiration.
C. **CORRECT:** Placing food on the unaffected side of the client's mouth will allow her to have better control of the food and reduce the risk of aspiration.
D. Due to the risk of aspiration, assistive personnel should not be assigned to feed the client because the client's swallowing ability should be assessed, and suctioning can be needed if choking occurs.
E. **CORRECT:** The client should be taught to flex her neck, tucking the chin down and under to close the epiglottis during swallowing.
NCLEX® Connection: Reduction of Risk Potential, Potential for Alterations in Body Systems
4. A. **CORRECT:** Clients who have global aphasia have difficulty with speaking and understanding speech. One strategy that can enhance client understanding is speaking to the client at a slower rate.
B. **CORRECT:** One strategy that can enhance understanding is the use of alternative forms of communication, such as flash cards with pictures or a computer.
C. For the client who has aphasia, speaking in a loud voice is unnecessary and can be interpreted as patronizing.
D. The nurse should allow the client adequate time to finish sentences and not complete the sentences for him.
E. **CORRECT:** One strategy that can enhance understanding is giving instructions one step at a time.
NCLEX® Connection: Physiological Adaptation, Alterations in Body Systems
5. A. A client who has experienced a right-hemispheric stroke will experience difficulty with impulse control.
B. A client who has experienced a right-hemispheric stroke will experience poor judgment.
C. **CORRECT:** A client who experienced a left-hemispheric stroke will demonstrate the inability to recognize familiar objects, known as agnosia.
D. A client who experienced a right-hemispheric stroke will experience a loss of depth perception.
NCLEX® Connection: Physiological Adaptation, Pathophysiology

PRACTICE Answer

Using the ATI Active Learning Template: Nursing Skill

NURSING INTERVENTIONS

- Assess gag reflex. If the gag reflex is present, give the client a small sip of water to determine if choking occurs.
- If the client exhibits difficulty managing food or fluids, a speech therapist should do a swallowing evaluation.
- Begin the client with a prescribed diet and observe closely for choking. Have suction equipment available. Initial feedings should be done by an RN, so appropriate interventions can be taken if choking occurs.
- Thicker liquids are usually tolerated better than thin liquids. Collaborate with the speech-language pathologist and dietitian to find the proper consistency and type of diet.

NCLEX® Connection: Physiological Adaptation, Illness Management