Raising awareness of hemorrhagic stroke
Stroke is an acute, focal neurologic deficit caused by a vascular disorder that injures brain tissue. There are two main types: ischemic stroke, caused by an interruption of blood flow in a cerebral vessel, and hemorrhagic stroke, caused by a rupture of a cerebral blood vessel. Although hemorrhagic stroke accounts for the minority of cases, it’s the most frequently fatal stroke, with spontaneous hemorrhage into the brain.

In this article, I’ll discuss hemorrhagic stroke—the most common etiology for persons ages 18 to 45.

Understanding the causes

Accounting for 41% of hemorrhagic stroke cases, intracranial hemorrhage is bleeding directly into the brain matter, usually occurring at bifurcations of major arteries at the base of the brain (the cerebral lobes, basal ganglia, thalamus, brainstem, and cerebellum) as a result of hypertension, cerebral atherosclerosis, brain tumors, or the use of medication such as anticoagulants, amphetamines, or illicit drugs. Subarachnoid hemorrhage—bleeding surrounding the brain tissue in the subarachnoid space generally from an arteriovenous malformation (AVM), cerebral aneurysm (most commonly at the circle of Willis), hypertension, or trauma—accounts for 17% (see Picturing two types of hemorrhage). Even with advances in diagnostic testing, 20% of strokes in younger persons continue to be of unknown etiology.

Before discussing the pathophysiology of hemorrhagic stroke, it’s important to understand the pathophysiology of its common causes: cerebral aneurysm, AVM, and hypertensive hemorrhage. Causes of hemorrhagic stroke not included in this discussion are trauma, chronic cocaine and amphetamine use, vasculitis, blood coagulation disorders, and cerebral tumors leading to erosion of surrounding vessels.

A cerebral aneurysm, also known as an intracranial aneurysm, is a dilation of the walls of a cerebral artery that develops as a...
result of weakness in the arterial wall. The probability of rupture increases with the size of the aneurysm. An aneurysm may be caused by atherosclerosis, a congenital defect of the vessel wall, hypertensive vascular disease, or head trauma. The most commonly affected cerebral arteries are the internal carotid, anterior cerebral, anterior communicating, posterior communicating, posterior cerebral, and middle cerebral arteries (see Picturing a cerebral aneurysm).

An AVM is a complex tangle of abnormal arteries and veins that lacks a capillary bed and is linked by one or more fistulas. Blood is shunted from the high pressure arterial system to the low pressure venous system without buffering at the capillary level. The draining venous channels are exposed to high levels of pressure, predisposing them to rupture and hemorrhage. A common cause of hemorrhagic stroke in young people, an AVM is considered to be a congenital abnormality.

A hypertensive hemorrhage can occur in the territory of penetrator arteries that branch off major intracerebral arteries. The penetrator vessels in patients with chronic hypertension develop intimal hyperplasia within the vessel wall. This can cause necrosis, which leads to breaks in the vessel wall and, ultimately, hemorrhage. Hypertension can be treated appropriately to reduce the

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### Picturing a cerebral aneurysm

**How it happens**

Prolonged hemodynamic stress and local arterial degeneration at vessel bifurcations are believed to be major contributing factors in the development and eventual rupture of cerebral aneurysms.

**Cerebral aneurysms are generally asymptomatic until they rupture. Look out!**
risk of hemorrhagic stroke when identified before chronic damage is done to the cerebral vessels.

In hemorrhagic stroke, rupture of a blood vessel leads to bleeding into brain tissue, resulting in edema, compression of the brain contents, or spasm of the adjacent blood vessels. Brain edema, or swelling of the brain tissue, occurs with the rupture of a blood vessel. There are two principal types of swelling: vasogenic edema—the influx of fluid and solutes into the brain through an incompetent blood-brain barrier that develops rapidly following injury—and cytotoxic edema—cellular swelling that occurs in brain ischemia and trauma. Edema can lead to increased intracranial pressure (ICP), as well as tissue shifts and brain displacement.

Risk factors aplenty
The major risk factors for hemorrhagic stroke include:

- obesity
- hypertension
- cigarette smoking
- excessive alcohol intake
- genetic predisposition for aneurysm formation

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The major risk factors for hemorrhagic stroke include:

- obesity
- hypertension
- cigarette smoking
- excessive alcohol intake
- genetic predisposition for aneurysm formation

Picturing two types of hemorrhage

**Intracranial hemorrhage**
An intracranial hemorrhage can occur like this one, which produced a hematoma that extended into the ventricle, almost rupturing it.

**Subarachnoid hemorrhage**
Hypertension may cause microaneurysms and tiny arterioles to rupture in the brain, creating pressure on adjacent arterioles and causing them to burst, which leads to more bleeding. Trauma can cause a subarachnoid hemorrhage, which places more pressure on the brain tissue.
• male gender (the incidence of hemorrhagic stroke is higher in men than women, according to the American Stroke Association)
• increased age.

Additionally, Hispanics (including Mexican Americans, Puerto Ricans, Cuban Americans, and Central and South Americans) and African Americans are at high risk for hemorrhagic stroke. The American Stroke Association found that hemorrhagic stroke occurred more commonly in Hispanics than in any other group. It’s the fourth leading cause of death among people of Hispanic descent. Studies also indicate that Hispanics have a higher rate of hemorrhagic stroke at a younger age than non-Hispanic Caucasians. African Americans, especially African American women due to a high prevalence of obesity, physical inactivity, and diabetes, have almost twice the risk of stroke compared with Caucasians, and the prevalence of hypertension in African Americans in the United States is the highest in the world, according to the American Stroke Association.

Warning signs
Identification of acute stroke symptoms is imperative for quick and early treatment to decrease morbidity and mortality. In one study, only 25% to 46% of stroke patients had arrived at the hospital within 3 hours after experiencing one or more warning signs of stroke. That’s why increasing public awareness about the emergent nature of stroke warning signs should be a primary focus for healthcare providers.

The symptoms of hemorrhagic stroke are often similar to ischemic stroke, including:
• hemiparesis (numbness or weakness of the face, arms, or legs, especially on one side of the body)
• confusion
• dizziness or loss of balance or coordination
• difficulty speaking or understanding speech, seeing in one or both eyes, or walking
• severe headache with no known cause.

Other symptoms that may be observed more frequently in patients experiencing acute intracranial hemorrhage include vomiting, an early sudden change in level of consciousness (LOC), and focal seizures due to brainstem involvement. In addition, patients experiencing a cerebral aneurysm or AVM may present with:
• a sudden, unusually severe headache
• loss of consciousness for a variable period of time
• nuchal rigidity (pain and rigidity of the back of the neck and spine) due to meningeal irritation
• visual disturbances (if the aneurysm is adjacent to the oculomotor nerve)
• tinnitus.

Immediate complications of hemorrhagic stroke include cerebral hypoxia, decreased cerebral blood flow, and extension of the area of injury. A serious complication of subarachnoid hemorrhage, cerebral vasospasm (narrowing of the lumen of the involved cranial blood vessel) accounts for 40% to 50% of the morbidity and mortality of patients who survive the initial intracranial bleed. Vasospasm is associated with increasing amounts of blood in the subarachnoid cisterns and cerebral fissures, leading to increased vascular resistance, which impedes cerebral blood flow and causes brain ischemia and infarction.

Frequently occurring 4 to 14 days after the initial hemorrhage when the clot undergoes lysis (dissolution) and reflecting the areas of the brain involved, signs and symptoms of vasospasm include worsening headache, a decrease in LOC, and the development of new focal neurologic deficits.

Diagnostic groundwork
Accurate diagnosis of acute hemorrhagic stroke is based on a complete history and
thorough physical and neurologic exams. Document a history of stroke, coexisting diseases or comorbidities, seizure disorder, drug abuse, or recent trauma. Current stroke documentation should include the time of onset and pattern, rapidity of symptom progression, and the specific focal symptoms. It’s important to find out if the patient takes insulin or an oral diabetes agent because this will help identify if his mental status is altered due to blood glucose level fluctuations (too high or too low). The physical exam should include careful evaluation of the neck, as well as thorough auscultation of the heart for murmurs. Clicks are suggestive of valvular disease or arrhythmias or may indicate previous cardiac surgery. Examine the patient’s skin for signs of cholesterol emboli (elevated hardened areas, particularly over joint regions) or any bruising. Bruising, whether severe or not, may be an indication of a clotting disorder and should be investigated further.

The following diagnostics should be completed upon admission to the ED:

- ECG
- complete blood cell count, including platelet level
- cardiac enzymes and troponin
- electrolytes
- blood urea nitrogen
- creatinine
- serum blood glucose
- prothrombin time, international normalized ratio, and partial thromboplastin time
- oxygen saturation value.

Imaging studies document the brain infarction and the anatomy and pathology of related blood vessels. A computed tomography (CT) scan is used to determine the type of stroke, the size and location of the hematoma, and the presence or absence of ventricular blood and hydrocephalus (an abnormal accumulation of cerebrospinal fluid [CSF] in the ventricles of the brain). Cerebral angiography is used to confirm the diagnosis of a cerebral aneurysm or AVM, providing information about the location and size of the lesion and the affected arteries, veins, adjoining vessels, and vascular branches. Lumbar puncture is used to confirm subarachnoid hemorrhage if there’s increased ICP and the CT scan is negative. Subarachnoid hemorrhage severity is classified using the Hunt-Hess classification system (see Hunt-Hess classification of subarachnoid hemorrhages).

### Hunt-Hess classification of subarachnoid hemorrhages

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Asymptomatic or mild headache and nuchal rigidity (stiff neck)</td>
</tr>
<tr>
<td>2</td>
<td>Cranial nerve (CN) palsy (oculomotor [CN III] or abducens [CN VI]), moderate to severe headache, and nuchal rigidity</td>
</tr>
<tr>
<td>3</td>
<td>Mild focal deficit, lethargy, or confusion</td>
</tr>
<tr>
<td>4</td>
<td>Stupor, moderate to severe hemiparesis, and early decerebrate rigidity</td>
</tr>
<tr>
<td>5</td>
<td>Deep coma, decerebrate rigidity, and moribund appearance</td>
</tr>
</tbody>
</table>

Add one grade for serious systemic disease (such as hypertension or chronic obstructive pulmonary disease) or severe vasospasm on angiography.
# The NIH Stroke Scale

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a. Level of consciousness (LOC)</td>
<td>Alert</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Arousable by minor stimulation</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Obtunded, strong stimulation to attend</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Unresponsive, or reflexic responses only</td>
<td>3</td>
</tr>
<tr>
<td>1b. LOC questions (month, age)</td>
<td>Answers both correctly</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Answers one correctly</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Both incorrect</td>
<td>2</td>
</tr>
<tr>
<td>1c. LOC, commands (open, close eyes; make fist, let go)</td>
<td>Obeys both correctly</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Obeys one correctly</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Both incorrect</td>
<td>2</td>
</tr>
<tr>
<td>2. Best gaze (eyes open—patient follows examiner’s finger or face)</td>
<td>Normal</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Partial gaze palsy</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Forced deviation</td>
<td>2</td>
</tr>
<tr>
<td>3. Visual (introduce visual stimulus/threat to patient’s visual field quadrants)</td>
<td>No visual loss</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Partial hemianopia</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Complete hemianopia</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Bilateral hemianopia</td>
<td>3</td>
</tr>
<tr>
<td>4. Facial palsy (show teeth, raise eyebrows, and squeeze eyes shut)</td>
<td>Normal</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Minor</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Partial</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Complete</td>
<td>3</td>
</tr>
<tr>
<td>5a. Motor; arm—left (elevate extremity to 90, and score drift/movement)</td>
<td>No drift</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Drift but maintains in air</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Unable to maintain in air</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>No effort against gravity</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>No movement</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Amputation, joint fusion (explain)</td>
<td>N/A</td>
</tr>
<tr>
<td>5b. Motor; arm—right (elevate extremity to 90, and score drift/movement)</td>
<td>No drift</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Drift but maintains in air</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Unable to maintain in air</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>No effort against gravity</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>No movement</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Amputation, joint fusion (explain)</td>
<td>N/A</td>
</tr>
<tr>
<td>6a. Motor; leg—left (elevate extremity to 30, and score drift/movement)</td>
<td>No drift</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Drift but maintains in air</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Unable to maintain in air</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>No effort against gravity</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>No movement</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Amputation, joint fusion (explain)</td>
<td>N/A</td>
</tr>
<tr>
<td>6b. Motor; leg—right (elevate extremity to 30, and score drift/movement)</td>
<td>No drift</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Drift but maintains in air</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Unable to maintain in air</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>No effort against gravity</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>No movement</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Amputation, joint fusion (explain)</td>
<td>N/A</td>
</tr>
<tr>
<td>7. Limb ataxia (finger-to-nose and heel-to-shin testing)</td>
<td>Absent</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Present in one limb</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Present in two limbs</td>
<td>2</td>
</tr>
<tr>
<td>8. Sensory (pin prick to face, arm, trunk, and leg—compare side to side)</td>
<td>Normal</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Mild to moderate loss</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Severe to total loss</td>
<td>2</td>
</tr>
<tr>
<td>9. Best language (name items, describe a picture, and read sentences)</td>
<td>No aphasia</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Mild to moderate aphasia</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Severe aphasia</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Mute</td>
<td>3</td>
</tr>
<tr>
<td>10. Dysarthria (evaluate speech clarity by having patient repeat words)</td>
<td>Normal</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Mild to moderate dysarthria</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Severe dysarthria, mostly unintelligible or worse</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Intubated or other physical barrier</td>
<td>N/A</td>
</tr>
<tr>
<td>11. Extinction and inattention (use information from prior testing to score)</td>
<td>No abnormality</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Visual, tactile, auditory, or other extinction to bilateral simultaneous stimulation</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Profound hemiattention or extinction to more than one modality</td>
<td>2</td>
</tr>
</tbody>
</table>

Total score

Adapted from NIH Stroke Scale. http://www.ninds.nih.gov/doctors/NIH_Stroke_Scale.pdf. It’s recommended that the full scale with all instructions be used.
The National Institutes of Health (NIH) Stroke Scale is an important and imperative tool to use in the diagnosis of acute hemorrhagic stroke in patients with sudden onset of symptoms (see *The NIH Stroke Scale*). The stroke scale should be readily available to all healthcare professionals who are in direct contact with patient treatment and identification of stroke.

**Treatment options**

After the diagnosis of hemorrhagic stroke is made, there’s a window of opportunity during which viable brain tissue can be saved. Management of hemorrhagic stroke involves a combination of medical and surgical interventions.

The goals of medical treatment are to allow the brain to recover from the initial bleeding, prevent or minimize the risk of rebleeding, and prevent or treat complications. The patient with acute hemorrhagic stroke should be monitored closely in the ICU. He’ll be placed on bed rest with sedation to prevent agitation and stress, and analgesics may be prescribed for head and neck pain. Any activities that suddenly increase BP or obstruct venous return are avoided, and external stimuli are kept at a minimum. If present, vasospasm, increased ICP, and systemic hypertension will also be managed.

The current American Heart Association stroke guidelines recommend appropriate antiepileptic therapy for the treatment of seizures in patients with intracranial hemorrhage. Nerve endings in the surrounding brain tissue affected by the hemorrhage are highly excitable, increasing the risk of seizures. Seizure precautions are maintained for every patient who may be at risk for seizures. If a seizure occurs, maintaining the patient’s airway and preventing injury are the primary goals. Antipyretic medications to lower temperature in febrile patients with stroke are also recommended.

The treatment of increased ICP should include a balanced and graded approach that begins with head of the bed elevation, analgesia, and sedation. More aggressive therapies include osmotic diuretics, drainage of CSF, neuromuscular blockade, and hyperventilation to maintain a cerebral perfusion pressure of greater than 70 mm Hg. Evidence also indicated that hyperglycemia during the first 24 hours after stroke is associated with poorer outcomes, so blood glucose levels should be adequately controlled.

Chronic hypertension is a common cause of intracranial hemorrhage. For this reason, BP monitoring and control is important to prevent sudden systemic hypertension. If BP isn’t controlled, the vessels may continue to rupture. Although specific goals for BP management are individualized for each patient, systolic BP may be lowered to less than 150 mm Hg to prevent enlargement of the hematoma; systolic BP shouldn’t drop below 140 mm Hg or increase above 160 mm Hg. If the patient’s BP is elevated, antihypertensive therapy may be prescribed.

The course of treatment after hemorrhage caused by an aneurysm rupture may include surgical intervention. Surgical removal of the hemorrhage via craniotomy with cerebral clipping an aneurysm.
decompression is recommended for patients with cerebral hemorrhages greater than 3 cm in diameter who are neurologically deteriorating or who have brainstem compression and hydrocephalus from ventricular obstruction. Performed by a neurosurgeon, a craniotomy involves a surgical incision into the skull and evacuation of the hematoma via suction.

For an aneurysm that hasn’t ruptured, the goal of surgery is to prevent bleeding by isolating the aneurysm from its circulation or by strengthening the arterial wall. The aneurysm may be excluded from the cerebral circulation by a stitch or clip around its neck (see Clipping an aneurysm). If this isn’t anatomically possible, the aneurysm is reinforced by wrapping it to provide support and induce scarring.

Less invasive procedures include endovascular treatment (occlusion of the parent artery) and aneurysm coiling (obstruction of the aneurysm site with a coil).

Watch for complications, such as rebleeding, psychological symptoms (disorientation, amnesia, and personality changes), intraoperative embolization, postoperative internal artery occlusion, fluid and electrolyte disturbances, and gastrointestinal bleeding.

**Regaining quality of life**

The nursing care of a patient who has undergone nonsurgical or surgical intervention following hemorrhagic stroke includes a complete neurologic assessment to evaluate for the following:

- altered LOC
- sluggish pupillary reaction
- motor and sensory dysfunction
- cranial nerve deficits
- speech difficulties and visual disturbances
- headache and nuchal rigidity or other neurologic deficits.

Report any significant changes to the healthcare provider, including an increase or drop in ICP, BP, heart rate, respiratory rate, temperature, urine output, and neurologic status. If your patient has undergone surgery, report any change in drainage from the surgical site.

Rehabilitation of a patient who has experienced a hemorrhagic stroke begins in the acute phase. The goal of rehabilitation is to help the patient return to the highest possible level of function and independence, while improving his overall quality of life. It’s important to focus on maximizing his capabilities at home and in the community. Stroke rehabilitation works best when the patient, his family members, and the rehabilitation staff work together as a team. General components of a rehabilitation program include preventing complications, treating disabilities and improving function, providing adaptive tools and altering the environment as appropriate, and teaching the patient and his family how to adapt to lifestyle changes. As his condition improves, a more extensive rehabilitation program may need to be initiated.

Teach your patient and his family the following:

- the signs and symptoms of stroke
- measures to prevent subsequent strokes
- potential complications, their signs and symptoms, and measures to prevent them
- psychosocial consequences of stroke and appropriate interventions
- safety measures to prevent falls
- names, indications, dosages, and adverse reactions of medications
- adaptive techniques for performing activities of daily living
- appropriate physical exercises for 30 minutes, three to four times per week
- smoking cessation, if applicable, and alcohol moderation
- dietary modification (a diet that’s rich in vitamins and minerals and low in salt, saturated fats, and refined sugars is recommended)
- how to measure his BP and when to report a BP measurement to the healthcare provider.
• the importance of keeping follow-up appointments.

In working with patients who’ve experienced a stroke and their families, it’s important for us as nurses to evaluate and assess the risk of stroke, encourage lifestyle changes, and support these patients in adapting to a healthier lifestyle. We can draw on our professional knowledge and expertise to lobby for and contribute to the development of policies that support health promotion and disease prevention initiatives. And, finally, we can contribute to the collection of stroke-related data that can enhance decision making in the event of an acute stroke.

Awareness and education

On a personal note, almost 2 years ago my husband, at age 30, dropped to the ground from an acute seizure and was taken to the hospital with a resulting diagnosis of a ruptured brain aneurysm. We had no forewarning except for a minor headache that persisted for 2 days before the rupture of the vessel in his brain. He did have a medical history of hypertension that was extremely well controlled; however, he had no family history of brain aneurysm. After his first brain surgery, he was monitored in the ICU and throughout the night began to experience signs of stroke. He stated that he couldn’t move his left hand, then he couldn’t move his entire left arm, and then the movement was gone in his left leg and foot. His condition deteriorated to a severe hemorrhagic stroke with midline brain shift. The diagnosis was made of a severe infarct of the entire anterior communicating artery. The second brain surgery resulted in the removal of the skull bone on the right front portion of his head, to be left off for a month so that swelling could occur without further brain damage, and a partial right frontal lobectomy. Little would we know at that time how our lives would change so significantly and how the power of determination and my husband’s strong will would overcome such odds. One milestone highly remembered was his determination to walk before our daughter took her first steps, and amazingly they both did it within days of each other. Currently, my husband is still recovering and has shown marked signs of improvement.

After witnessing firsthand the effects of a hemorrhagic stroke, I must reiterate the importance for us as healthcare professionals to be able to provide quick and thorough interventions to help decrease morbidity and mortality for these patients. For those who survive a hemorrhagic stroke, we need to help them regain the best possible quality of life. We also need to educate patients and their families about the risk of future stroke and how to reduce risk factors. With better understanding and knowledge of hemorrhagic stroke, the frequency of fatalities may decrease.

Learn more about it


National Stroke Association. Public stroke prevention

memory jogger

Remember to teach patients and their families to act FAST when signs and symptoms of stroke are suspected.

Face: Ask the person to smile. Does he have a facial droop on one side of the face?

Arms: Ask the person to raise both arms. Does one arm drift downward?

Speech: Ask the person to repeat a sentence. Are the words slurred? Does he repeat the sentence correctly?

Time: If the person has any of these symptoms, call 911 immediately.

On the Web
These online resources may be helpful to your patients and their families:
American Stroke Association: http://www.strokeassociation.org
Centers for Disease Control and Prevention’s Division for Heart Disease and Stroke Prevention: http://www.cdc.gov/stroke/

For more than 28 additional continuing education articles related to neurological topics, go to Nursingcenter.com/CE.

CE Connection

INSTRUCTIONS
Raising awareness of hemorrhagic stroke

TEST INSTRUCTIONS
• To take the test online, go to our secure Web site at http://www.nursingcenter.com/CE/nmie.
• On the print form, record your answers in the test answer section of the CE enrollment form on page 54. 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 $21.95 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.
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The more CE, the merrier!
1. A stroke is defined as a(n)
a. acute, focal neurologic deficit caused by a vascular disorder.
b. result of chronic ischemic blood flow to the brain.
c. acute muscular deficit caused by brain hemorrhage.

2. The two main types of stroke are
a. subarachnoid and intracranial.
b. ischemic and intracranial.
c. ischemic and hemorrhagic.

3. The most frequently fatal stroke is
a. ischemic.
b. intracranial.
c. hemorrhagic.

4. Intracranial hemorrhage is defined as bleeding
a. that surrounds the brain.
b. directly into the brain matter.
c. caused by an arteriovenous malformation (AVM).

5. The two principal types of brain edema are
a. vasogenic and cytotoxic.
b. hemorrhagic and vasogenic.
c. intracranial and vasogenic.

6. Which of the following patients has the most risk factors for hemorrhagic stroke?
a. obese Caucasian woman
b. African American man age 45 to 65
c. obese Hispanic man

7. Which statement about cerebral vasospasm following subarachnoid hemorrhage is correct?
a. It’s caused by coagulation of blood in areas of the brain.
b. It often occurs 4 to 14 days after the initial bleed.
c. It accounts for 60% of deaths among survivors of an initial bleed.

8. The stroke memory jogger “FAST” stands for
a. face, arms, speech, and time.
b. feeling, awareness, speech, and tremor.
c. face, arms, spatial awareness, and time.

9. A patient who has experienced a subarachnoid hemorrhage, with mild focal deficit, lethargy, or confusion would be assigned a Hunt-Hess classification grade of
a. 1.
b. 2.
c. 3.

10. Elevated hardened areas over joint regions are usually signs of
a. cholesterol emboli.
b. small muscle infarcts.
c. blood emboli indicative of an impending stroke.

11. A computed tomography scan determines all of the following except
a. type of stroke.
b. size and location of the hematoma.
c. diagnosis of cerebral aneurysm.

12. Cerebral angiography is used to confirm
a. hemorrhage in the subarachnoid space.
b. the diagnosis of AVM.
c. the type of stroke.

13. American Heart Association stroke guidelines recommend that following intracranial hemorrhage, seizures be treated with
a. antiepileptic therapy.
b. antipyretics.
c. normalization of blood glucose.

14. A stroke patient’s cerebral perfusion pressure must be greater than
a. 50 mm Hg.
b. 60 mm Hg.
c. 70 mm Hg.

15. In a patient experiencing hemorrhagic stroke, systolic BP should be maintained between
a. 90 and 110 mm Hg.
b. 120 and 130 mm Hg.
c. 140 and 160 mm Hg.

16. The goal of surgery for an unruptured aneurysm is
a. removal of the aneurysm via craniotomy.
b. isolation of the aneurysm or strengthening of the arterial wall.
c. removal of the aneurysm via angioplasty.

17. All of the following statements are correct except
a. Hyperglycemia following stroke is associated with poorer outcomes.
b. A sudden change in level of consciousness is a late symptom of acute intracranial hemorrhage.
c. Neuromuscular blockade is sometimes used to treat increased intracranial pressure.