



**American  
Stroke  
Association.**

*A division of the  
American Heart Association.*

# Explaining Stroke



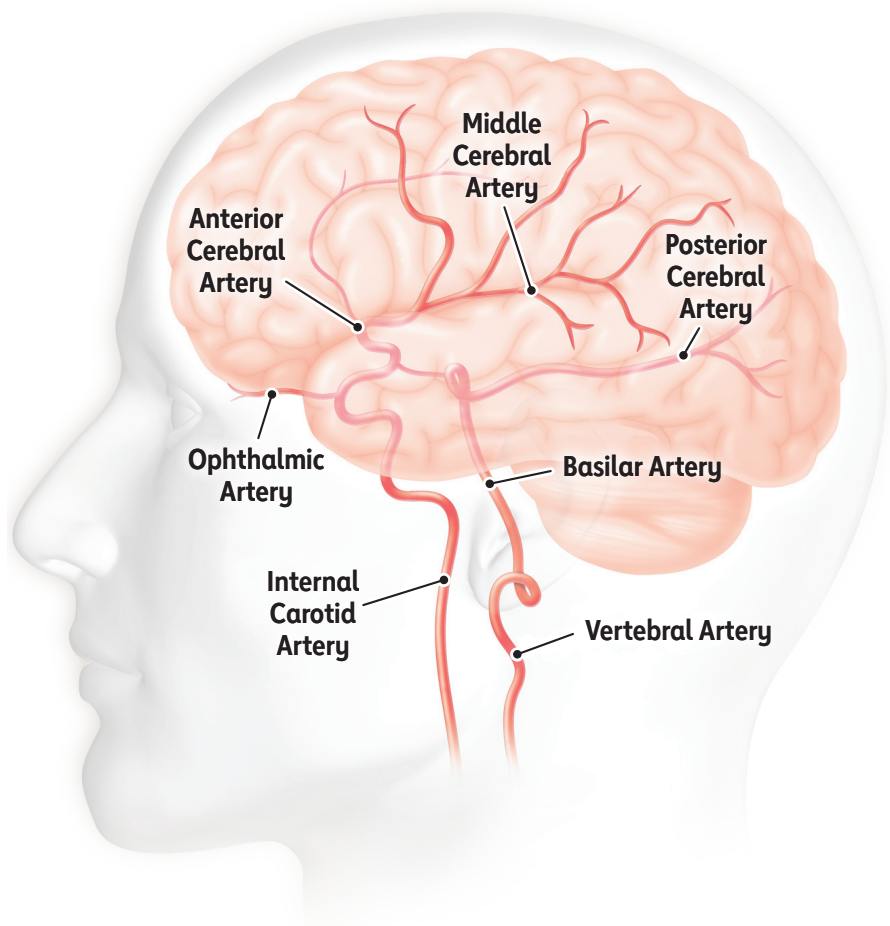
# Introduction

Explaining Stroke is a practical step-by-step booklet that explains how a stroke happens, different types of stroke and how to help prevent a stroke. Many people think a stroke happens in the heart, but it happens in the brain. **Read on to learn more.**

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# What is a Stroke?

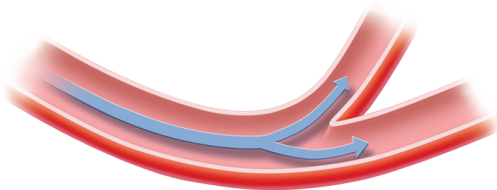


Blood vessels that carry blood to the brain from the heart are called **arteries**. The brain needs a constant supply of blood, which carries the oxygen and nutrients it needs to function. Specific arteries supply blood to specific areas of the brain. A **stroke** occurs when one of these arteries to the brain is either blocked or bursts. As a result, part of the brain does not get the blood it needs, so it starts to die.

# Blood Flow in Normal and Blocked Arteries

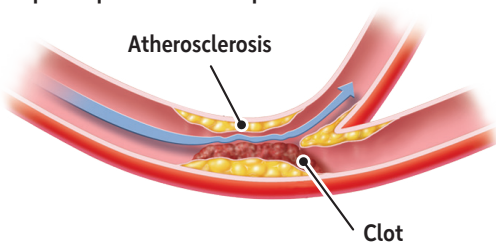
## NORMAL ARTERY

Blood flows easily through a clear artery.



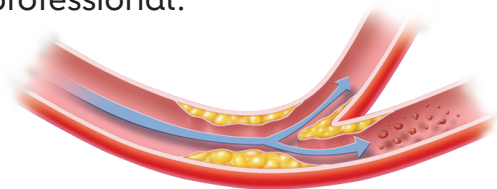
## BLOCKAGE

An artery can become blocked by **plaque** (a fatty substance in the wall of the artery) or a **blood clot**, which reduces blood flow to the brain and causes a stroke. This picture shows **atherosclerosis**, a hardening of the arteries. Atherosclerosis is caused partly by cholesterol or plaque buildup.

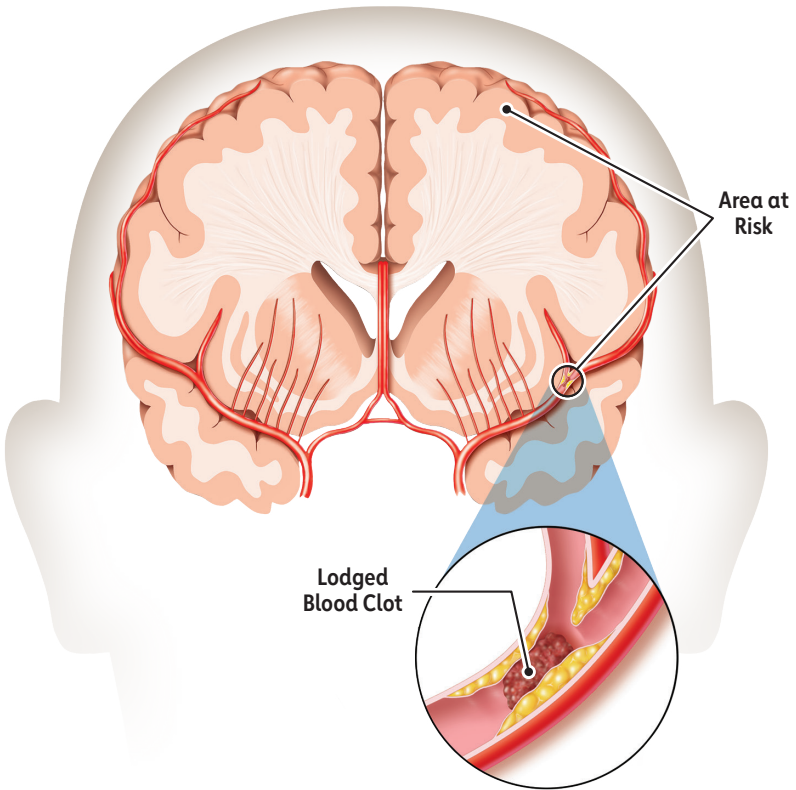


## CLOT DISSOLVES

A transient ischemic attack or TIA has the same signs and symptoms of a stroke, but they only last a short time. The plaque or blood clot breaks up and blood flow is restored to the brain and there is no permanent damage. A TIA is serious and needs to be evaluated by a healthcare professional.

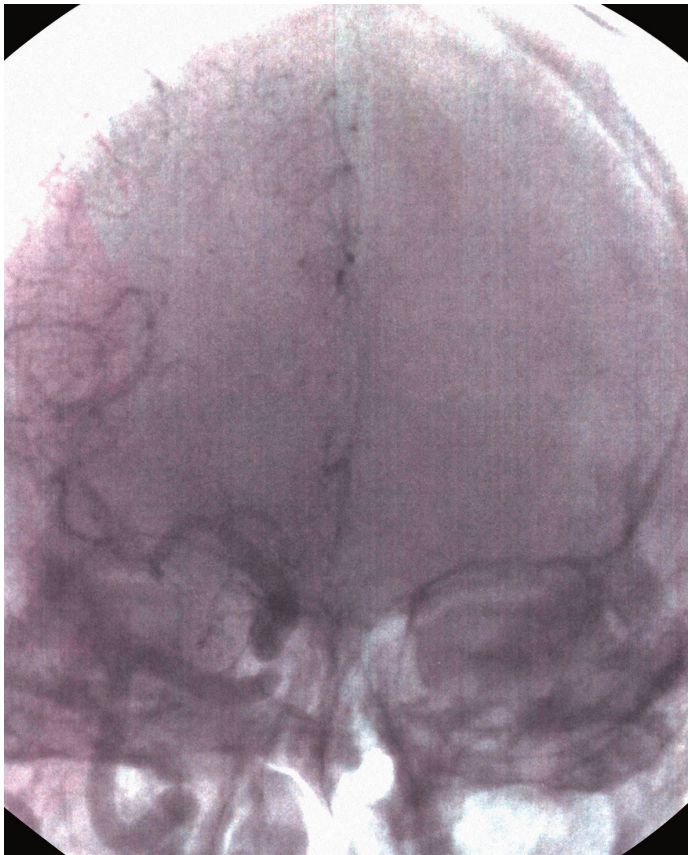


# Blood Flow to the Brain



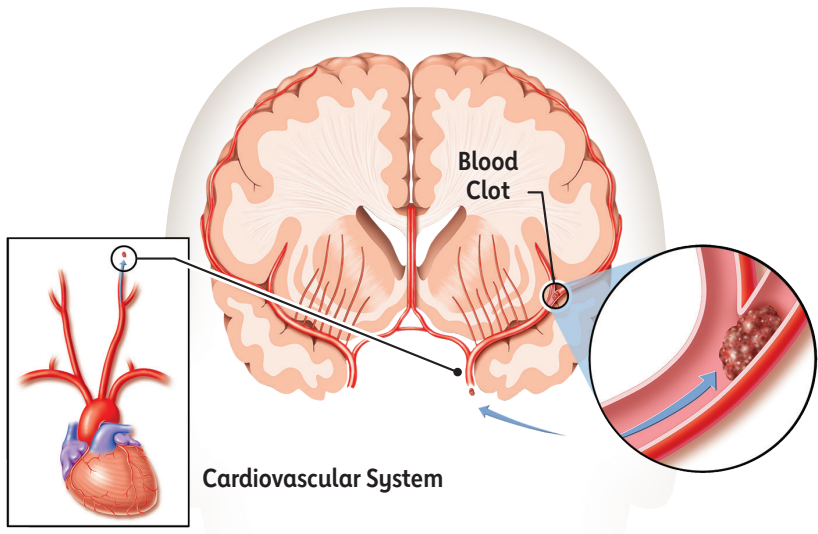
This picture shows a blood clot blocking an artery in the brain. Without enough blood flow, brain cells begin to die.

# Arteriography



The doctor will take an x-ray picture of your brain, called an **arteriogram** or **angiogram**. A dye is injected into the blood vessels that lead to the brain. The dye will show up on the x-ray and help locate blocked, narrowed or damaged blood vessels in the brain.

# ■ Ischemic Stroke



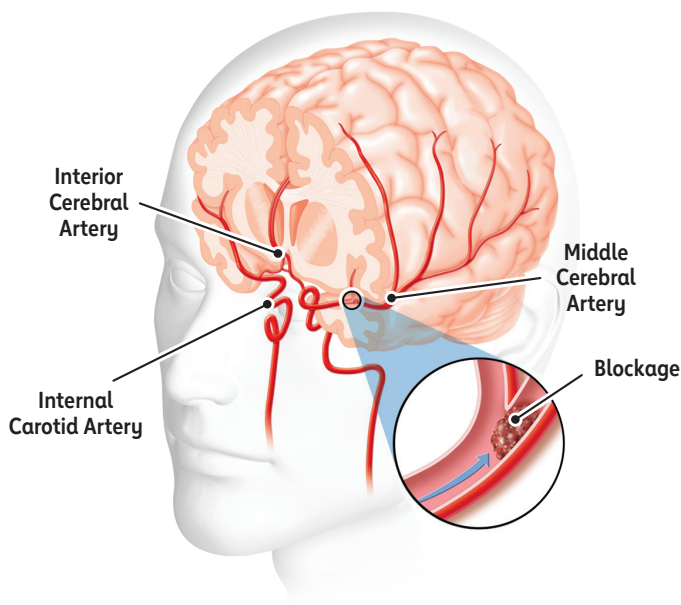
## Ischemic Stroke

**Ischemic stroke** is the most common type of stroke. An ischemic stroke happens when an artery in the brain is blocked. There are two types of ischemic stroke:

**Embolic Stroke:** In an embolic stroke, a blood clot or plaque fragment forms, usually in the heart or the large arteries leading to the brain, and then moves through the arteries to the brain. In the brain, the clot blocks a blood vessel and leads to a stroke.

**Thrombotic Stroke:** A thrombotic stroke is a blood clot that forms inside an artery that supplies blood to the brain. The clot interrupts blood flow and causes a stroke.

# ■ Transient Ischemic Attack (TIA)



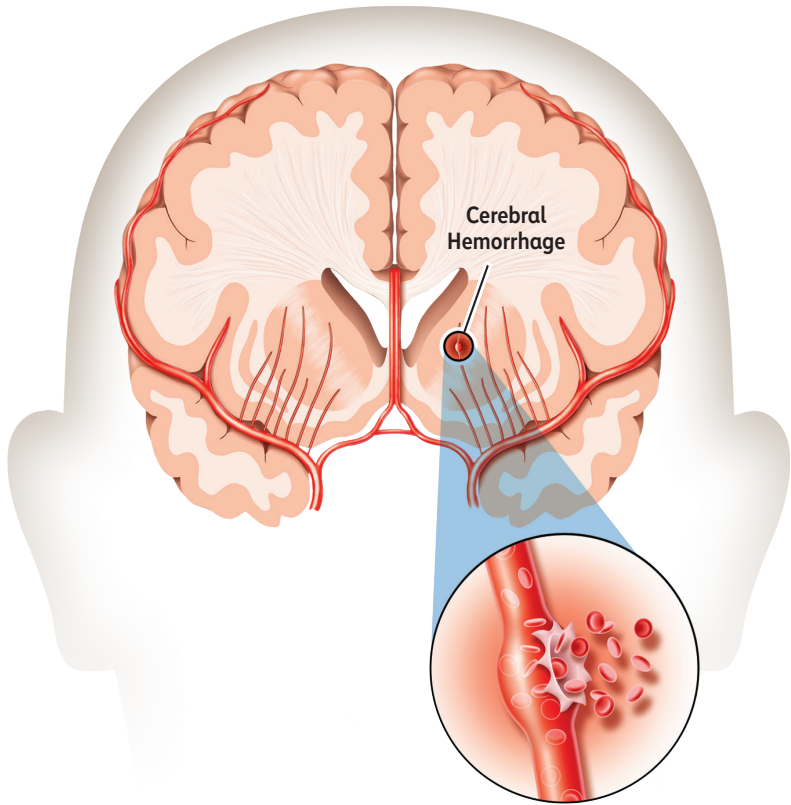
A **transient ischemic attack, or TIA**, is a temporary blockage of blood flow to the brain. The clot usually dissolves on its own or gets dislodged, and the symptoms usually last less than five minutes.

Common warning signs include **sudden**:

- Weakness, numbness or paralysis on one side of the body
- Loss of vision in one or both eyes or double vision
- Trouble speaking or difficulty understanding others
- Dizziness, confusion, or problems with balance or coordination
- Severe headache with no known cause

While a TIA doesn't cause permanent damage, it's a "warning stroke" signaling a possible full-blown stroke ahead. When you first notice symptoms, get help immediately, even if symptoms go away.

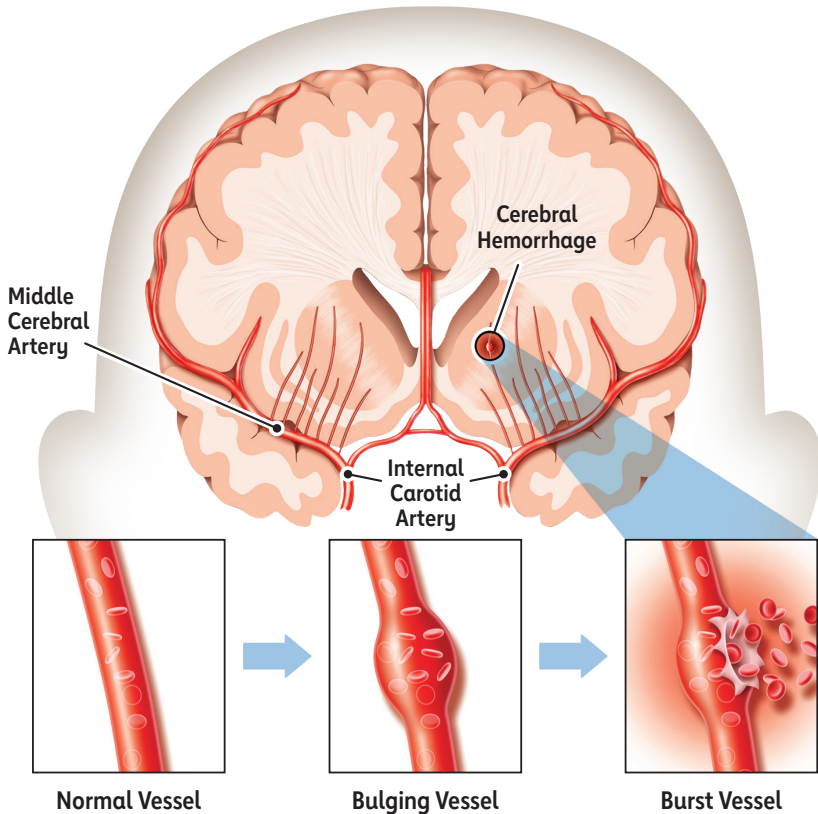
# ■ Hemorrhagic Stroke



A **hemorrhagic stroke** happens when a blood vessel in the brain bursts and spills blood into or around the brain. High blood pressure, aneurysms (see page 12) and other causes can make blood vessels weak enough to burst.

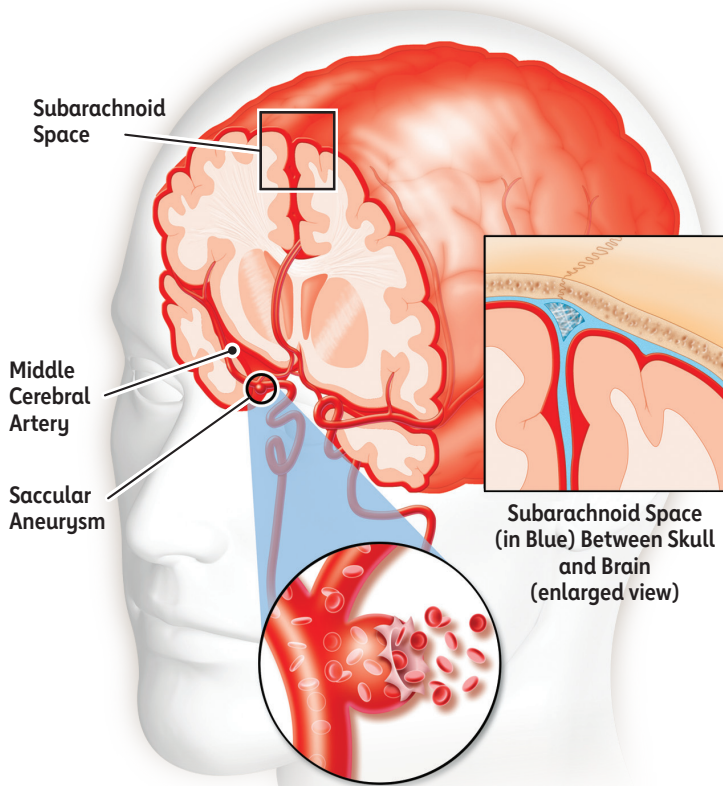
There are different types of hemorrhagic stroke, including intracerebral hemorrhage and subarachnoid hemorrhage.

# ■ Intracerebral Hemorrhage



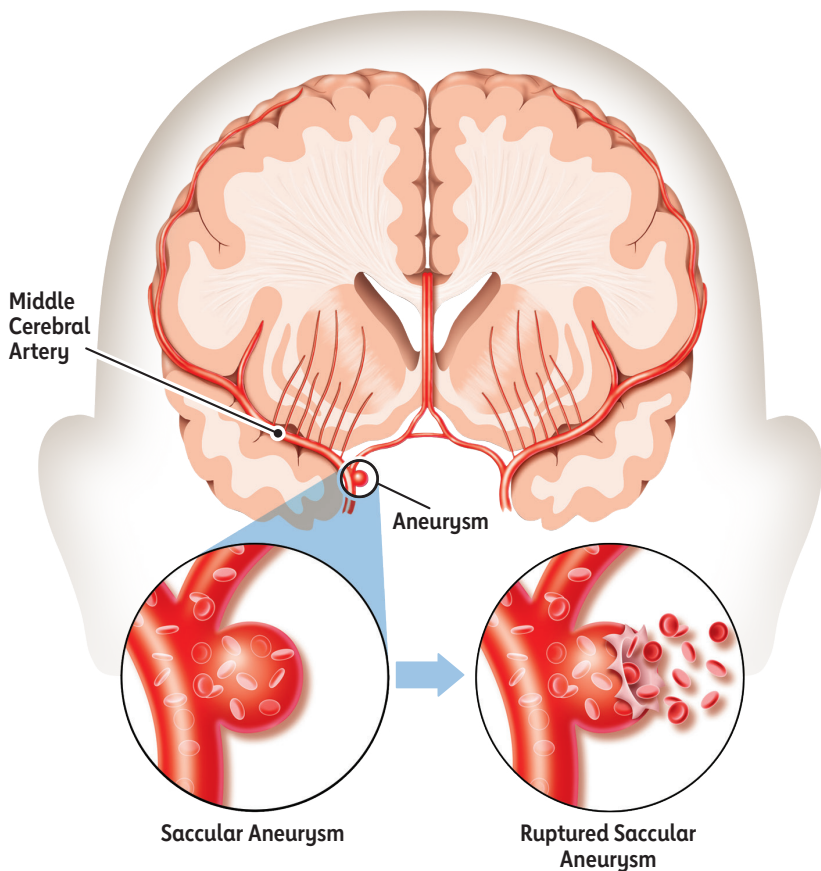
One kind of hemorrhagic stroke is called an **intracerebral hemorrhage**. This kind of stroke is caused when a burst blood vessel bleeds into brain tissue. The bleeding causes brain cells to die and the part of the brain that is affected stops working correctly. High blood pressure, also called **hypertension**, is the most common cause of this type of stroke.

# ■ Subarachnoid Hemorrhage



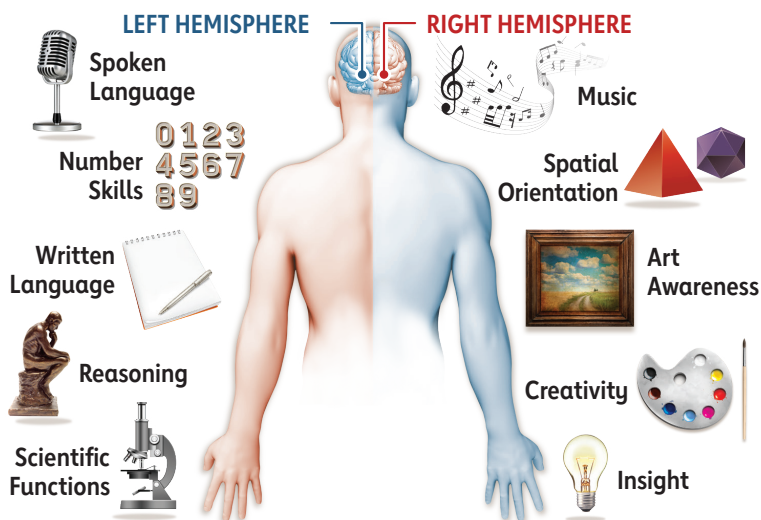
Another kind of hemorrhagic stroke is called a **subarachnoid hemorrhage**. In this type of stroke, a blood vessel bursts near the surface of the brain and blood leaks into the space between the brain and the skull (the subarachnoid space). Blood that collects in this space puts pressure on brain tissue and causes blood vessels to spasm. This type of stroke can be caused by different things but is usually caused by a burst aneurysm.

# ■ Aneurysm



An **aneurysm** is a weak spot on the wall of an artery that bulges out into a thin bubble. As it gets bigger, the wall may weaken and burst. If it bursts, blood leaks inside or around the brain.

# How a Stroke Affects You



## The Sides of the Brain

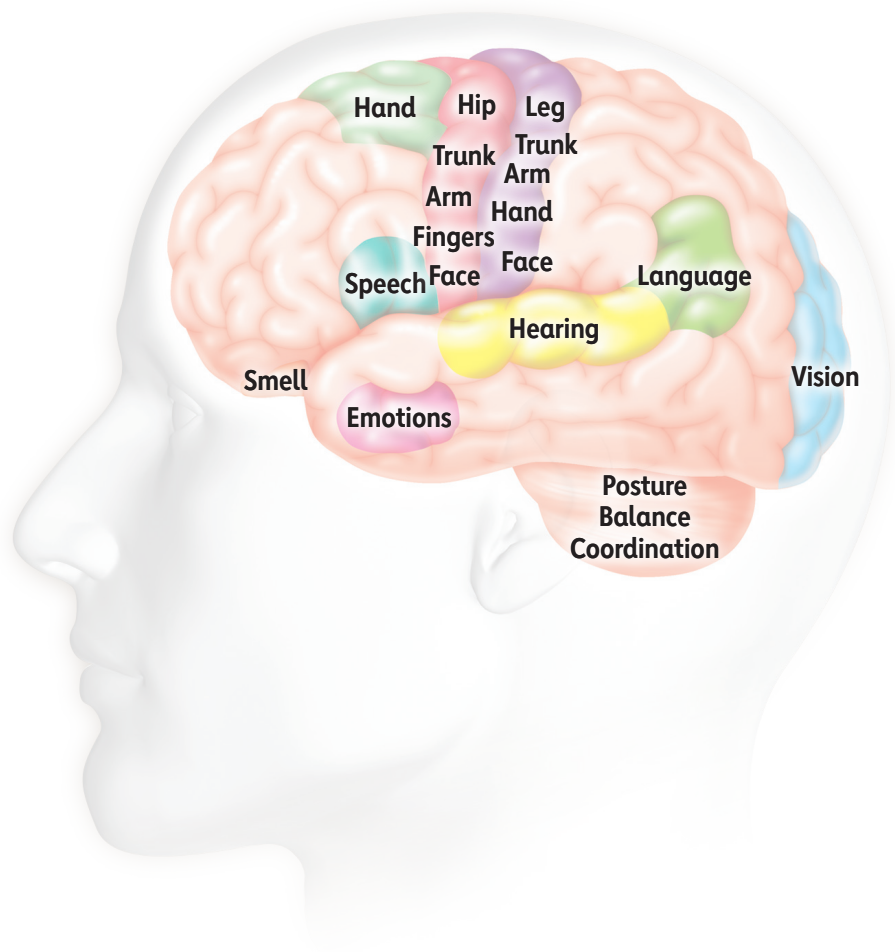
**A stroke on the left side of the brain affects the right side of the body** and you may experience some of the following:

- Speech and language problems
- Inability to read, write and learn new information
- Impaired ability to do math or to organize, reason and analyze things

**A stroke on the right side of the brain affects the left side of the body** and you may experience some of the following:

- Problems with depth perception or directions, such as up or down, and front and back
- Inability to be creative, such as painting a picture, or to appreciate art and music
- Failure to recognize the emotion in someone's voice

# Moving and Sensing Things



The human brain has different areas that control how the body moves and feels. When a stroke damages a certain part of the brain, that part may not work as well as it did before. This can cause problems with walking, speaking, seeing or feeling. There may be challenges with basic self-care such as bathing or dressing, eating, swallowing, memory, emotions and understanding surroundings that should be familiar.

# Some Effects of Stroke

After a stroke, you may have emotional and physical changes. Depending on the amount of brain damaged and the part of your brain that was affected, you might have problems with:

|                                      |                                                   |
|--------------------------------------|---------------------------------------------------|
| <b>seeing</b>                        | <b>sleeping</b>                                   |
| <b>having seizures</b>               | <b>controlling<br/>your bladder<br/>or bowels</b> |
| <b>moving parts<br/>of your body</b> | <b>pain</b>                                       |
| <b>fatigue</b>                       | <b>thinking</b>                                   |
| <b>memory</b>                        | <b>depression</b>                                 |

# Help Prevent Another Stroke

**If you've had a stroke, you're at risk of having another one. Do these things to help prevent another stroke.**

**If you have high blood pressure, lower it.** Measurement of 130/80 mm Hg and above is considered high blood pressure, work with your healthcare professional to manage it.

**Find out if you have atrial fibrillation (AFib).** AFib is a quivering or irregular heartbeat that can lead to blood clots and cause a stroke. Your healthcare professional can tell you if you have AFib and help you manage it.

**If you smoke, stop.** Smoking can double the risk for stroke.

**If you drink alcohol, limit your intake.** Heavy alcohol use can increase your risk for stroke.

**Lower your cholesterol (the fat-like substance in your blood).** After a stroke or TIA, it's recommended to keep low-density lipoprotein cholesterol (LDL-C), also known as "bad" cholesterol, as low as possible — often <55 mg/dL — to help prevent another stroke.

**If you have diabetes, follow your healthcare professional's advice carefully to get your blood sugar level under control.** Having diabetes increases your risk of stroke. Talk with your healthcare professional about healthy eating habits and medications, if needed, that may help you manage your diabetes and support your overall health.

**Exercise daily.** Even a little exercise—a brisk walk, swim or yard work—can improve your health and may reduce your stroke risk. Check with your healthcare professional before starting a new exercise regimen.

**Cut down on sodium and saturated and trans fat.** By reducing these, you can lower your risk for stroke, high blood pressure and heart disease.

# Carotid Artery Disease

**Carotid artery disease**, also called carotid artery stenosis, occurs when fatty deposits (plaques) clog the blood vessels that deliver blood to your brain and head. This condition develops slowly and results in a narrowing of the arteries, increasing your risk of stroke. There are often no symptoms and the first sign may be a stroke or TIA. Regular checkups are important, and your healthcare professional can listen to the arteries in your neck with a stethoscope for abnormal sounds. Other tests, such as carotid ultrasound, are available and can be recommended by your healthcare professional.

**Cerebral angiography:** A test that uses contrast dye and X-rays to provide detailed images of the brain's blood vessels.

To effectively treat carotid artery disease, healthcare professionals recommend to:

- Follow recommended lifestyle habits (see page 16)
- Take medications as prescribed
- Have a medical procedure to improve blood flow:

**Carotid endarterectomy (CEA):** During this surgery, the fatty deposits (plaques) narrowing the arteries in your neck are removed.

**Carotid artery stenting (CAS):** This newer treatment involves the placement of a permanent stent (small, expandable tube) in the artery that holds the artery open.

# Stroke Symptoms

SPOT A STROKE™ WITH B.E. F.A.S.T.

## B.E.

Balance  
Loss

Eye (Vision)  
Changes

## F.A.S.T.

Face  
Drooping

Arm  
Weakness

Speech  
Difficulty

Time to  
Call 911

Beyond B.E. F.A.S.T., other stroke symptoms include:

- **Sudden numbness** or weakness of face, arm, or leg, especially on one side of the body
- **Sudden confusion**, trouble speaking or understanding speech
- **Sudden severe headache** with no known cause

**NOTE THE TIME WHEN ANY SYMPTOMS FIRST APPEAR.**

Medical options exist that may reduce the long-term effects of stroke if administered soon after the onset of stroke.



**Stroke is an emergency. Calling 911 is the fastest way to get stroke care. EMS can begin treatment immediately and alert the hospital stroke team before you arrive.**

# Stroke Treatment

If the medical care team diagnoses a stroke, they may provide the following drugs or procedures for treatment. Your treatment will depend on several factors unique to your stroke.

## Medications

**Thrombolytics:** These are drugs that can break up a blood clot and are given through an I.V. or catheter, not through a pill. Two common types of thrombolytics used to treat acute ischemic stroke are Alteplase and Tenecteplase.

**Dual Antiplatelet Therapy (DAPT):** This means taking two drugs that help stop blood clots from forming in the blood vessels. This is done to prevent another stroke from happening.

## Procedures

**Endovascular Thrombectomy:** This is a minimally invasive procedure that uses a catheter and a device to remove the blood clot. This is also called mechanical thrombectomy.

**Surgery** may be needed instead of these treatments or in combination with one or more of these treatments.

Learn more at [stroke.org](https://www.stroke.org).

**For stroke information,**  
call the American Stroke Association  
at **1-888-4-STROKE** (1-888-478-7653)  
or visit **stroke.org**.

*For information on life after stroke,  
call and ask for the Stroke Family Warmline.*

**For heart- or risk-related information,**  
call the American Heart Association at  
**1-800-AHA-USA1** (1-800-242-8721)  
or visit us online at **heart.org**.

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