

Stroke

There are two major types of stroke:

1. An **ischemic stroke** is characterized by the interruption of blood flow in cerebral blood vessels. It is the most common type of stroke. An ischemic stroke can occur due to reduction in blood flow to the brain because of severe vasodilation or hemorrhage in other parts of the body that reduces cerebral perfusion. It can also be caused by atherosclerosis or a blood clot. There are two different types of ischemic stroke that can occur due to blood clots:
 1. Thrombotic strokes are characterized by a clot forming inside one of the brain arteries. They occur more often in large vessels.
 2. Embolic strokes are caused by a moving blood clot that travels from its origin to the brain. They occur more often in smaller blood vessels. Cerebral emboli mostly originate from a thrombus in the left heart or in an atherosclerotic plaque in the carotid arteries. Cardiac conditions like rheumatic heart disease, atrial fibrillation, mitral valve disease, recent heart attack, ventricular aneurysm, and bacterial endocarditis predispose one to the development of emboli that could lead to embolic stroke.
2. A **hemorrhagic stroke** occurs when a blood vessel breaks and bleeds into brain tissue. Two leading causes are high blood pressure and trauma. Advanced age can also increase risk. Hemorrhagic strokes have a higher fatality rate.

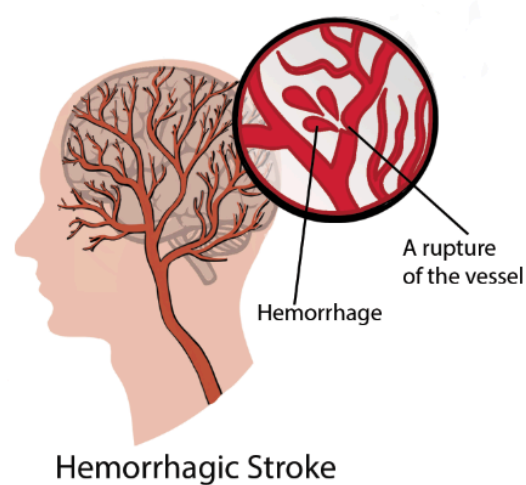
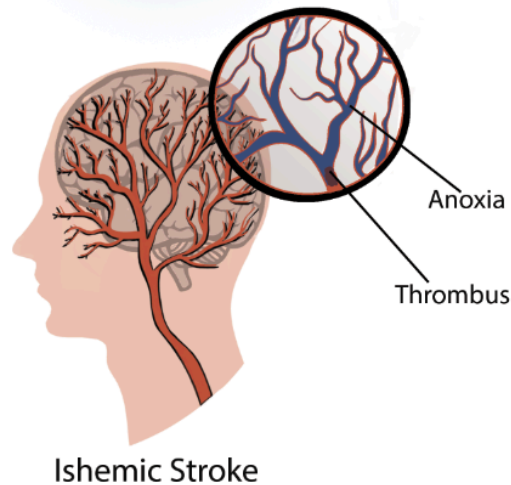
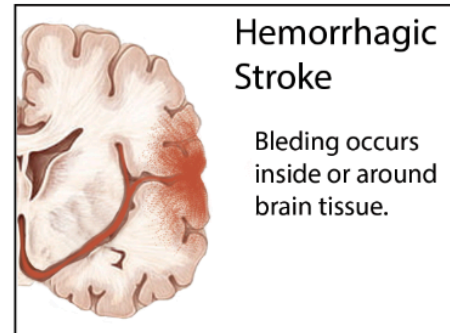
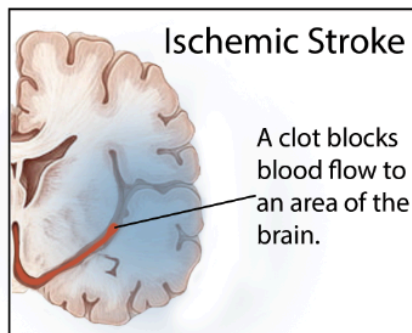


Image by BYU-I Student Mary H. S21

Two other subtypes of stroke include:

- A **transient ischemic attack (TIA)** is a temporary disturbance in cerebral blood flow where a penumbra develops and then disappears. Penumbra is the name given to the area of brain tissue that has reduced perfusion. TIAs generally last a few minutes. After the penumbra disappears, there will be no signs of any neurological deficit and the symptoms that were previously experienced will not remain. Most signs and symptoms disappear within an hour. TIAs most often occur hours or days before an actual stroke, so seeking medical attention immediately following a possible TIA is very important. TIAs are caused by the same things that cause an ischemic stroke, but the degree of injury is much less. Atherosclerosis is probably the most common instigator of TIA symptoms.
- A **silent CNS infarction** is where there are signs of a stroke but not obvious symptoms. Individuals who experience a silent stroke are often surprised to be told that there are radiographic signs of damage to brain cells.

Risk factors for a stroke include hypertension, hyperlipidemia, smoking, diabetes, heart disease, coronary artery disease (CAD), coagulation disorders, obesity, alcohol abuse, and cocaine use. Alcohol consumption and cocaine use increase the risk for stroke because they contribute to hypertension and hypercoagulability. Alcohol also lowers cerebral blood flow and increases atrial fibrillation risk. Cocaine contributes to vasospasms, enhances platelet activity, increases heart rate, increases body temperature, and increases metabolic rate. Red blood cell disorders like polycythemia and sickle cell disease also increase the risk for stroke as these conditions can cause blockage in small capillary beds perfusing the brain. Hormone replacement therapy for women can increase the risk for stroke because estrogen is known to stimulate the liver to increase clotting factor production.

CT and MRI scans are important for diagnosing strokes and distinguishing between ischemic and hemorrhagic stroke. They are also used to rule out intracranial lesions that may present with similar symptoms. It is essential to know what type of stroke a patient has before treating it. If it is an ischemic stroke due to a blood clot, clot busters to thin the blood would be helpful. However, blood thinners are contraindicated in hemorrhagic stroke and would worsen the problem.

Tissue plasminogen activator (tPA) is useful in the treatment of some ischemic strokes caused by blood clots. It should be administered to a patient with acute ischemic stroke within 3-4.5 hours after the onset of symptoms. The major complication associated with the use of tPA is intracranial hemorrhage of the infarcted brain.

Post-stroke deficits include motor, speech/language, cognitive, sensory, visual, and behavioral deficits. They involve the following:

- **Dysarthria:** slurred speech
- **Dysphagia:** difficulty with swallowing
- **Receptive aphasia:** individuals have difficulty understanding written and spoken language
- **Expressive aphasia:** the inability to easily communicate spontaneously or translate thoughts or ideas into meaningful speech
- **Hemineglect:** the inability to attend to and react to stimuli coming from one side of the body
- **Hemiparesis:** weakness of one side of the body
- **Spastic paralysis:** spasticity in muscles that is caused by an imbalance of inhibitory and stimulatory signals going to muscles from the brain and spinal cord
- **Apraxia:** inability to carry out previously learned motor activities despite normal sensory and motor function
- **Agnosia:** impaired recognition of normal sensory input
- **Paresthesia:** tingling
- **Neuropathic pain**
- **Hemianopia:** blindness over half of a field of vision (also called hemianopsia)
- **Monocular blindness:** visual impairment in one eye



This content is provided to you freely by BYU-I Books.

Access it online or download it at https://books.byui.edu/bio_381_pathophysiol/621_stroke.

