



Information for Patients Regarding Brain Aneurysms

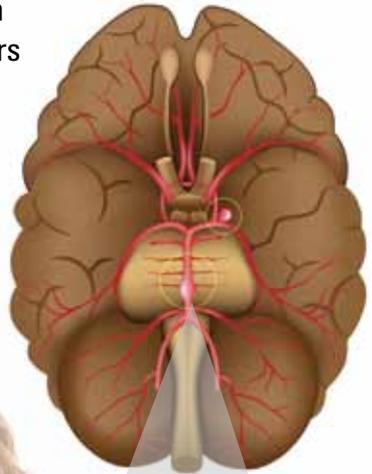


What is a brain aneurysm?

A brain aneurysm is an abnormal, outward bulging of an artery in the brain caused by weakness in the arterial wall. Aneurysms can occur at any age, however aneurysms are most often detected in patients between the ages of 40 and 60 years. In addition, aneurysms are more prevalent among women (60%), and approximately 20% of patients have two or more aneurysms.

What causes aneurysms?

There are various causes for brain aneurysms. Some people may be genetically prone to aneurysms which is why your physician will be interested in your family history. An estimated 6 million people in the United States have an unruptured brain aneurysm, or 1 in 50 people. These risk factors may also contribute to the development of a brain aneurysm. Doctors and researchers believe these risk factors may contribute to the *rupture* of a brain aneurysm.



What are the symptoms of brain aneurysms?

Although some aneurysms can go unnoticed for a lifetime, some aneurysm patients will experience the following symptoms:

- Limited eye movement
- Dilated pupils
- Double vision
- Pain above and behind eye
- Localized headache (may indicate a rupture)

Ruptured Aneurysms

Many individuals do not experience any symptoms from an aneurysm and may only realize they have one, once it ruptures. The rupture of a cerebral aneurysm is considered a medical emergency. Up to 25% of patients suffering a ruptured aneurysm will die before reaching a hospital. When an aneurysm ruptures, blood will flow from the artery into the subarachnoid space surrounding the brain, known as a subarachnoid hemorrhage (SAH). The symptoms are proportional to the degree of hemorrhage. The rupture may lead to stroke, vasospasm (constriction of the brain arteries) and increased pressure on the brain. Sometimes patients describing “the worst headache in my life” are actually experiencing one of the symptoms related to a ruptured brain aneurysm.

Other symptoms include:

- Intense headache
- Nausea and vomiting
- Stiff neck or neck pain
- Blurred or double vision
- Pain above and behind the eye
- Dilated pupils
- Sensitivity to light
- Loss of sensation

How are brain aneurysms diagnosed?

Asymptomatic, unruptured aneurysms can be diagnosed and located by MRI (Magnetic Resonance Imaging), MRA (Magnetic Resonance Angiography) or by CT imaging (Computed Tomography Scan). This cerebral arteriography is used to confirm the presence of an aneurysm and to evaluate which treatment options may be best suited for particular aneurysms based on size, shape and location. A lumbar puncture or spinal tap may also be used to detect the presence of blood in the Cerebral Spinal Fluid (CSF), which may indicate the rupture of a brain aneurysm.

How are brain aneurysms treated?

With the increase in imaging technology, unruptured aneurysms are being detected more often. Although the aneurysm is unruptured, there may be cause for concern and a treatment warranted.

- Risk of hemorrhage – what is the probability of the aneurysm rupturing?
- Size and location
- Age and health of patient
- Family history
- Surgical risks

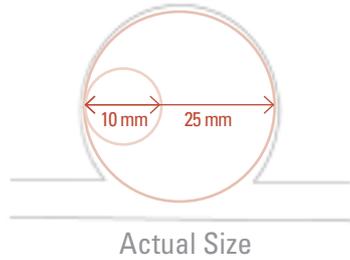
Depending on your aneurysm, the physician may recommend surgical clipping, endovascular coiling or observation and medical management.

What are the types of aneurysms?

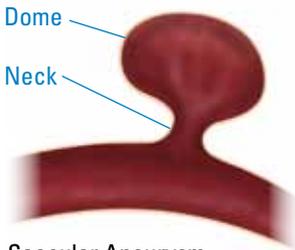
Aneurysms can be classified by size and shape.

Size

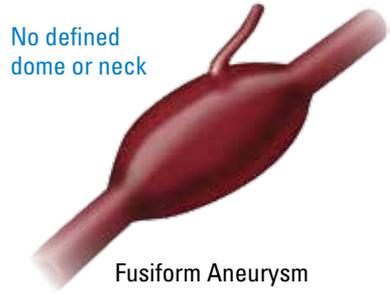
SMALL	Up to 10 mm
LARGE	10 - 25 mm
GIANT	Larger than 25 mm



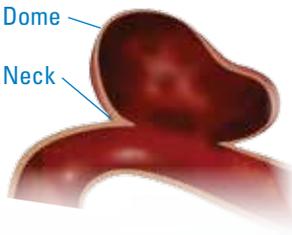
Shape



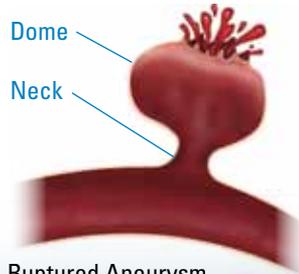
Saccular Aneurysm



Fusiform Aneurysm



Wide-neck Aneurysm

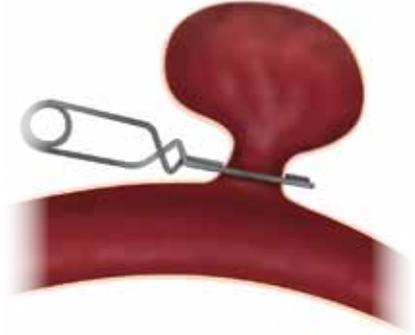


Ruptured Aneurysm

Treatment options

Surgical Clipping

Surgical clipping has been the traditional method for treatment of brain aneurysms. This method requires a neurosurgeon to perform a craniotomy (removal of part of the skull) to access the brain and blood vessels. The surgeon blocks blood flow to the aneurysm by applying a metal clip to its base, redirecting the blood flow away from the aneurysm. Then the wound is sealed again and closed.



Endovascular Coil Therapy

Endovascular coil therapy is a less invasive method of treatment for aneurysms. During endovascular treatment, a catheter (small tube) is inserted into the patient's femoral artery in the leg and advanced through the body until the aneurysm is accessed from the inside. Small soft platinum coils are then inserted through the catheter until the flow of blood into the aneurysm is blocked. This reduces pulsation, and over time, new tissue will cover the opening of the aneurysm, preventing the aneurysm from growing or bleeding.



There are different types of coils available with some that expand and may further fill the aneurysm. The procedure is performed under angiography and this imaging technique allows the physicians to visualize vessels to assist with properly placing the coils.

By blocking the flow, the pressure on the aneurysm is reduced. Over time, new tissue will grow at the opening of the aneurysm and blood flow will be diverted away from the aneurysm.



In some cases, the neck or opening in the aneurysm is very large and it is possible that the coils can prolapse or migrate out of the aneurysm sac. In these cases a stent may be placed inside the artery and provide a bridge to keep the coils inside the aneurysm. Occasionally, a balloon catheter also may assist with inserting the coils into the aneurysm.



Glossary

Aneurysm An abnormal bulging sac created in the wall of a blood vessel, especially an artery. An aneurysm is typically due to a structural weakness in the vessel. Main categories of aneurysms include: fusiform and berry.

Asymptomatic A term used if a patient is a carrier for a disease or infection but experiences no symptoms. A condition might be asymptomatic if it fails to show the noticeable symptoms of the disease or condition with which it is usually associated.

Angiography A radiology procedure using x-ray and opaque dye that helps identify abnormalities of the blood vessels in the brain.

Artery A vessel that carries the blood (transporting oxygen and nutrients) from the heart to tissues throughout the body. Arteries are more muscular and elastic than veins to accommodate higher blood pressures.

Cerebrospinal Fluid (CSF) Fluid surrounding the brain that acts as a cushion.

Circle of Willis An intercommunicating set of arteries that connect the principal arteries supplying blood flow to the brain.

Craniotomy A procedure to remove a lesion in the brain through an opening in the skull (cranium).

Endovascular Coil Therapy A less invasive procedure to treat a ruptured or non-ruptured aneurysm in the brain by implanting coils within the aneurysm sac.

Magnetic Resonance Angiography (MRA)
Magnetic Resonance Imaging (MRI)
Computed Tomographic Angiography (CTA scan)

These are non-invasive diagnostic angiography tests that produce high-resolution images of the brain.

Meninges The collective term for the three membranes that envelope the brain: the dura mater (outer layer), the arachnoid membrane (middle layer) and the pia mater (inner layer).

Stent/Neuro An implantable device to assist with creating a bridge in the vessel to assist with keeping the coils within the aneurysm.

Stroke There are two main types of stroke, thrombotic and hemorrhagic. A stroke is an injury to the brain caused by loss of blood flow to a portion of the brain or by injury related to bleeding within the brain.

Subarachnoid Space The space between the arachnoid and the pia mater membranes surrounding the brain. This space contains the cerebrospinal fluid. If an aneurysm ruptures, blood will spill into this space and is referred to as a subarachnoid hemorrhage.

Surgical Clipping A surgical procedure to treat a ruptured or non-ruptured aneurysm which requires the physician to perform a craniotomy (removal of part of the skull) to access the brain and blood vessels.

Vasospasm Narrowing of a blood vessel, typically in response to the initial rupture of an aneurysm.



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