

# NEUROSURGERY CLINIC



DR. SARANG GOTECHA  
(MCH NEUROSURGERY)  
CONSULTANT BRAIN AND  
SPINE SURGEON

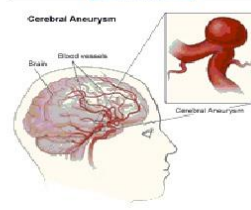
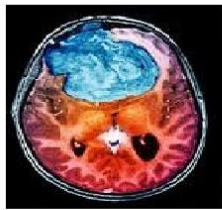
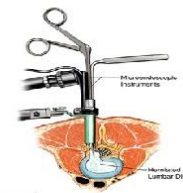
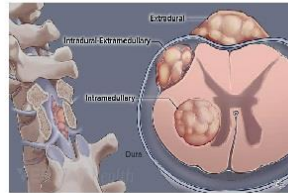
PHONE: 9322288645

EMAIL: dr.saranggotecha@gmail.com

www.dr.saranggotecha.com

FELLOWSHIP IN MINIMALLY INVASIVE SPINE SURGERY, SEOUL

WORLD FEDERATION OF NEUROSURGICAL SOCIETIES FELLOWSHIP(WFNS) FELLOWSHIP, SINGAPORE

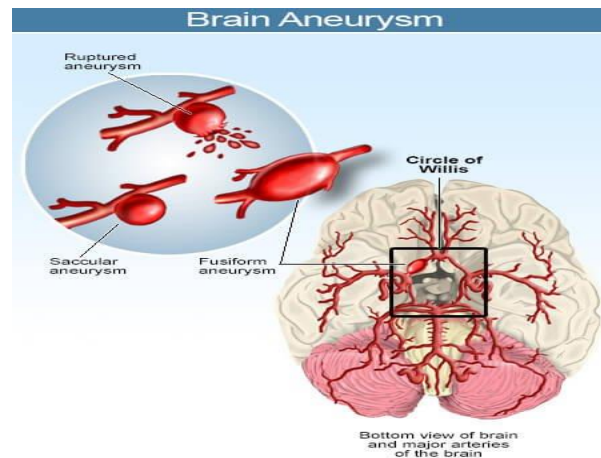


**SPECIALITIES:** BRAIN TUMOUR SURGERIES, MICROVASCULAR SURGERIES,  
NEUROENDOSCOPIC SURGERIES, TRANSNASAL ENDOSCOPIC SURGERIES, MINIMALLY  
INVASIVE SPINE SURGERIES, COMPLEX SPINE SURGERIES, PEDIATRIC NEUROSURGERIES

# Brain Aneurysm

## What is brain aneurysm?

A brain aneurysm is a weak or thin spot on a blood vessel in the brain that balloons out and fills with blood. It is usually located along main arteries that run on the underside of the brain and the based the skull.



## Who is affected?

Brain aneurysms can occur in all age groups, with peak age of rupture presentation ranging between 40 to 60 years old. Women have a higher incidence than men.

The exact mechanism on how aneurysms develop is still not fully understood. It is thought to be a degenerative process with a number of contributory factors such as increasing age, smoking, atherosclerosis (blood vessel disease) in which fats build up on the inside of artery walls, and high blood pressure. Injury or trauma to blood vessels, infection, tumor, alcohol and drug (example: cocaine) abuse may cause aneurysm. Brain aneurysms are also more common in people with certain genetic diseases, such as connective tissue disorders, polycystic kidney disease and certain circulatory disorders, such as arteriovenous malformation.

## What are the symptoms?

Most people with brain aneurysm may not experience any symptom until it ruptures or becomes fairly large.

Up to 40% of the people experience sentinel headache days to weeks before the aneurysm ruptures. This is due to small warning leak' from the aneurysm.

A large aneurysm may exert pressure on a nerve or surrounding brain tissue and may cause pupillary dilatation, visual disturbance, numbness, weakness, or paralysis on one side of the face or eye pain.

At the time of aneurysm rupture, the following may occur.

- Sudden onset of severe headache (often described as the 'worst' headache of their lives)
- Nausea and/or vomiting
- Change in mental state or loss of consciousness
- Seizure
- Stiff neck
- Sensitivity to light
- Vision and/or speech impairment
- Numbness and/or weakness in any part of body (Any of these symptoms can be very serious. Emergency medical attention should be sought immediately).

### **How is brain aneurysm diagnosed?**

Most brain aneurysms may be undetected until they rupture. They can also be detected incidentally by brain imaging performed for another condition.

### **Computed Tomography (CT) Brain**

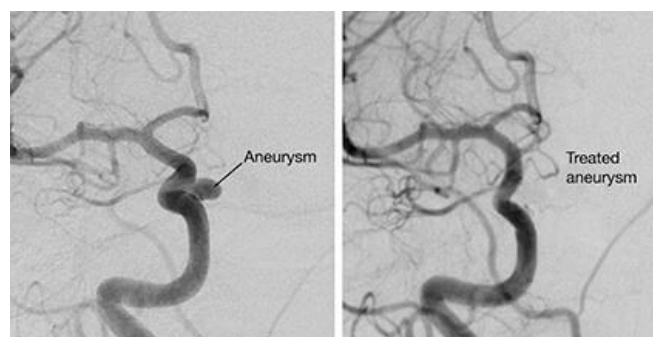
CT scan of the head is a fast painless, non-invasive diagnostic tool that can detect blood in the brain (subarachnoid hemorrhage) when one has the symptoms mentioned above. This is often the first diagnostic procedure for detecting aneurysm rupture.

### **Cerebral Angiography**

Cerebral Angiography is an invasive procedure that invokes the use of contrast dye to provide a series of pictures of the blood vessels in the head and neck with access through the groin. It is the gold standard to determine the exact location, size and shape of the aneurysm.

### **CT Angiography (CTA)**

This is a non-invasive method whereby a contrast dye is injected into the arm vein with CT scanning to produce detailed images of blood flow in the brain arteries. The gold-standard for detecting a brain aneurysm still remains cerebral angiography. CTA is frequently performed as it is less invasive.



## Cerebral angiography showing an aneurysm

### **Magnetic Resonance Imaging (MRI) and MR Angiography (MRAI)**

MRI is another imaging technology to view the brain by using a strong magnetic field. It is able to provide a more detailed image of the brain than CT.

MRA utilizes MR technology to produce imaging of blood vessels of the brain.

Cerebrospinal Fluid Analysis may be ordered if a ruptured brain aneurysm is highly suspected despite a normal CT brain following application of a local anesthetic. A small amount of fluid is removed from the back by a spinal needle. The fluid is tested for presence of blood.

### **What are the dangers of brain aneurysms?**

Brain aneurysms may rupture and bleed, causing serious complications including stroke, coma or death. After initial rupture, the aneurysm may rupture and re-bleed again. Re-bleeding has a 60.80% risk of death and severe disability. The risk of re-bleed is approximately 15% per day, reaching a cumulative risk of 20% at the end of first 2 weeks and 50-60% at the end of 6 months.

The type of bleeding after an aneurysm rupture is commonly or technically known as subarachnoid hemorrhage.

Hydrocephalus - Blood from a ruptured brain aneurysm can block the fluid circulation in the brain. This causes an excessive accumulation of fluid within the brain cavity (ventricles). This condition is known as hydrocephalus. Pressure in the brain rises and death can occur if left untreated. To treat this condition, a temporary external drain is usually inserted via an operation.

Cerebral vasospasm - Usually at 7-10 days after the aneurysm rupture, blood vessels in the brain may spontaneously contract and limit blood flow to vital areas of the brain resulting in stroke.

Cerebral vasospasm is monitored by a combination of close neurological examination and Transcranial Doppler (TCD) ultrasound. To prevent vasospasm, a drug called Nimodipine is usually given for duration of 21 days. After the aneurysm is treated, patient is kept well hydrated and blood pressure may be kept slightly higher to prevent vasospasm. An angiographic procedure may be performed to inject nimodipine directly into the affected arteries if the vasospasm is severe.

Other possible common complications following brain aneurysm rupture may include brain swelling, seizure, electrolyte imbalance, infection & death.

### **What are the treatment options?**

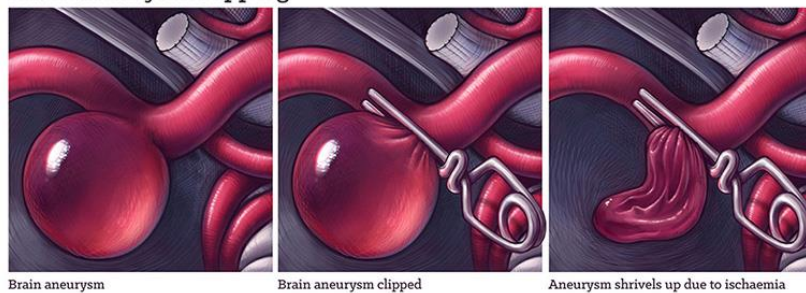
Patients with very small aneurysms may be monitored closely to detect any growth or onset of symptom. Each case is unique. Careful considerations are made to weigh the benefits and risks of treatment of unruptured aneurysms. Factors include the type, size, and location of the aneurysm, patient's age and wish, patient's health condition, family history and risks of treatment option.

Two options are generally for treating brain aneurysm.

### Surgical Therapy

**Microvascular clipping** involve cutting off the flow of blood to the aneurysm surgically with a clip. Under general anesthesia, the Neurosurgeons use a microscope to locate the aneurysm and dissect it carefully. One or more clips (usually titanium) is placed on the neck of the aneurysm. It prevents blood from entering the aneurysm and removes the rupture risk. The clip remains in the patient permanently. Clipping has been shown to be highly effective. In general, aneurysms that are completely clipped surgically do not return.

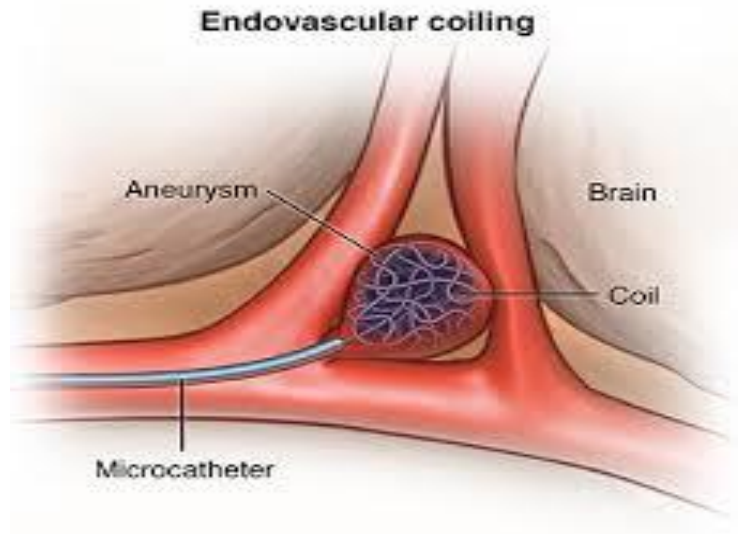
Brain aneurysm clipping



### Endovascular Therapy

**Endovascular embolization** a less invasive procedure performed by an endovascular surgeon. Once the patient has been anesthetized, the doctor inserts a catheter into an groin artery and threads it to the site of the aneurysm using a guide wire. Detachable coils are passed through the catheter and released into the aneurysm. The coils in the aneurysm and induce blood clot in the aneurysm.

It is important to understand that the aim of surgical clipping or endovascular coiling is to secure the aneurysm to prevent future rupture or re-bleeding. The damage caused by the original rupture is still not overcome. Medical treatment of the patient continues to support recovery of any existing damage.



### **Can brain aneurysms be prevented?**

There is no known prevention method for brain aneurysm. People with known brain aneurysm should have good control of high blood pressure and stop smoking.

### **What is the prognosis?**

An un-ruptured aneurysm may go unnoticed throughout a person's lifetime. A burst brain aneurysm, however, may be fatal or cause permanent brain damage.

The prognosis for ruptured aneurysm is largely dependent on the age and health of the individual and the severity of initial bleeding (and re-bleeding). It is estimated that about 40 percent of patients with ruptured aneurysm do not survive the First 24 hours. Up to another 25% may succumb within 6 months.

Patients who receive treatment for an un-ruptured aneurysm generally require less rehabilitative therapy and recover more quickly. Recovery from ruptured aneurysm may take weeks to months.