Cerebral Aneurysm

DEPARTMENT OF NEUROSURGERY

An aneurysm is a weakened place on the wall of an artery. The weakened place makes a "bubble" that can burst. Some people have aneurysms on arteries in other parts of their body. Cerebral means it is in the head.

What causes an aneurysm?
One to two percent of the population is born with a cerebral aneurysm. Many times people go through life never knowing they have one. Aneurysms can also be caused by high blood pressure, from the increased pressure over time causing a weakened area on the wall of an artery.

Although aneurysms are more common in some families than others, they are not hereditary and cannot be passed from a mother or father to a child. They are not caused by a mother who did something wrong during pregnancy.

What happens when your aneurysm ruptures?
As blood normally travels through an artery, it is under pressure. Over time, this pressure can be too much for the aneurysm, causing it to burst, or rupture. A rupture, often called a "bleed," causes bleeding outside the artery and inside the skull, usually in an area called the subarachnoid space. You will hear the medical team calling this a subarchnoid hemorrhage.

Blood that has pooled, or gathered, outside the arteries in the brain causes a person to act different. The differences depend on how much blood there is and exactly where in the brain it is. People with a ruptured cerebral aneurysm can be awake and know who and where they are, or they can be confused, not recognizing family members, or they may be in a coma. Some comas are light, and a person acts very drowsy, and some comas are deep, like a deep, deep sleep.

If the person survives the rupture, blood makes clots around the break and stops the bleeding. When a clot forms, the clot is not as strong as the original wall which ruptured, and the aneurysm could bleed again. This is called a re-bleed.

How are re-bleeds prevented?
To prevent re-bleeds, it will be necessary for the patient to stay very quiet in a dark room. Nurses and doctors try to limit anything that can cause excitement, such as visitors or activity. Patients are not allowed to eat or drink foods that are very hot or very cold because they could cause a shock to the system by causing a change in the pressure in the head.

What happens in the hospital?
Your treatment team is made up of doctors, nurses, care partners, medical receptionists, physical, speech and occupational therapists, social worker, case manager, service associate, dietitian, and chaplain. This team does everything possible to make patients comfortable, watch their condition and make the right decisions about treatment and surgery. Deciding on treatment is very complicated. Each
patient is different and must be treated individually. The doctors and nurses will let you know as much as possible along the way, but it is often difficult to predict outcomes.

Treatment begins with finding out exactly what the problem is. If the doctors think it might be a ruptured cerebral aneurysm, they can do several kinds of tests to make sure.

Usually, the first test is a CT scan of the head. A CT scan is a special kind of x-ray that allows doctors to see cross-sectional views of the brain. It is painless. It shows where and how much the patient has bled, but it does not show an aneurysm.

If the CT scan shows that the patient has not bled, the doctor might do a lumbar puncture to look for blood in the spinal fluid. To do a lumbar puncture, an area on the lower back is numbed, and a sterile needle is inserted to draw off some spinal fluid. The sample of fluid is then sent to the laboratory for analysis.

If the CT scan shows that the patient has bled, the doctor might do an MRI/MRA scan to look for problems with arteries in the head and to look at the blood in the brain. The scan is painless, except for having an IV placed for injection of the dye. It is similar to a CT scan, but it shows the arteries and takes 1 to 2 hours.

The doctor might also do an arteriogram of the brain to find out if and where the aneurysm is. The radiologist will usually talk with the family before this procedure. This test usually takes 2 to 3 hours. A tiny tube called a catheter is placed into an artery, usually in the upper leg. With a special x-ray camera, doctors can watch as they gently move the catheter through arteries up to the neck. Then they inject a harmless dye into the artery so it can be seen more clearly. The doctor who does this procedure has been specially trained to diagnose aneurysms. Neurosurgeons will also look at the pictures to confirm the diagnosis.

Especially for Families

You can’t see or touch a cerebral aneurysm. It is inside the skull. A day or two ago everything probably seemed normal. Suddenly a family member is acting very different, hospitalized here at Vanderbilt in an intensive care unit. You probably have a lot of questions about the treatment, about the outcome, and you might not be getting answers. The lack of information can make you feel even more frightened and helpless.

I understand some of your feelings because my husband had a cerebral aneurysm. When it happened, I felt like my life changed completely in just a few hours. There were so many things I wanted to know and understand. Being a nurse did not help much because I had never had patients with this kind of problem.

The most important thing I learned was to leave the hospital at night to sleep. You need to take care of yourself and get rest. Yes, it’s hard to leave a family member, even though you know there’s nothing you can do. A nurse or doctor can always call you if there’s a change in condition. If you live outside Davidson County, your social worker can help you find lodging.

I wrote this booklet to help you know more about cerebral aneurysms and understand what the doctors and nurses can do, what they cannot do, and why some of your questions have no answers.

Jody Semmelroth, RN
Treatment options
After the diagnosis of an aneurysm has been made, the doctors will decide on treatment. They may want to perform surgery or they may wait until the vasospasm period is over. If the patient is too sick or too unstable, they may decide to postpone surgery.

Surgical clipping
The goal of surgery is to prevent the aneurysm from rupturing. One way is to clamp it so that blood traveling through the artery cannot flow into the aneurysm. The surgery is called clipping, and it is not simple because there is not much room inside the skull. Also, bleeding may have caused swelling and irritation in the area, making the space even more crowded.

Coiling
Another way to prevent a rupture is to strengthen the aneurysm. Several tiny metallic coils are temporarily straightened and then delivered through an artery to the aneurysm. Inside the aneurysm their coil memory allows them to return to a coil shape to add support to the wall of the “bubble.” The coils prevent blood from pounding against the wall of the aneurysm. The coils also have a chemical that promotes clotting in the immediate area to seal off the aneurysm.

What is vasospasm?
Doctors believe that the blood from a ruptured aneurysm irritates arteries and causes them to constrict, or squeeze together. This is called vasospasm or spasm. When an artery is in spasm, blood flow decreases or is shut off, usually causing increased confusion, sleepiness, and weakness. Since blood carries oxygen that is necessary for the brain, vasospasm is serious, and the nurses and doctors will do all they can to prevent it or reduce its severity. Most vasospasm occurs four to fourteen days after a bleed. However, it can happen up to twenty-one days afterward.

To monitor a vasospasm, the patient has a bedside transcranial Doppler called a TCD. This is an ultrasound of the arteries in the brain, and it monitors spasms. It is painless. These ultrasound tests are generally done every other day.
**Medicines**

Medicines will be chosen for each patient individually because every patient, every aneurysm, is different.

- Blood pressure regulators help keep blood pressure in the brain in a certain range.
- Anti-seizure medicines prevent seizures, which may be caused by irritation of the brain.
- Diuretics increase urination, which reduces the amount of fluid in the brain, making less pressure and irritation.
- Anti-acids decrease acid in the stomach to help prevent an ulcer.
- Stool softeners make bowel movements easier. Straining for a bowel movement creates pressure in a person’s head.
- Sedatives and pain medicines are used only occasionally because they can hide even the tiniest signs of a change in a person's condition. These changes are important for doctors and nurses to see.

**Other treatments**

- A mechanical ventilator or breathing machine might be used to increase oxygen in the brain and help decrease pressure inside the skull to prevent any other damage.

- A ventricular drain is a tube placed in the brain to measure the amount of pressure inside the skull and drain off extra fluid.

- If a person cannot swallow because of sleepiness or coma, an NG tube or Dobhoff tube is placed through the nose to the stomach so medicines and specially prepared liquid food can be given.

- A cardiac monitor allows the doctors and nurses to know how a person's heart is working.

- An arterial catheter may be placed in the wrist. It allows doctors and nurses to know what a person's blood pressure is at all times. An arterial line also allows nurses to get samples of blood without having to use a needle every time.

- A triple lumen is a special IV catheter placed in the neck. It allows multiple IV medicines to be given at one time, and it also allows for blood draws and minimal heart monitoring.

- A pulmonary artery catheter is similar to a triple lumen but allows more advanced heart monitoring.

- A foley catheter drains urine from the bladder. This allows doctors and nurses to measure the amount of urine to make sure the patient has the right amount of fluids in the body.

- More CT or MRI scans might be ordered to check for a re-bleed if the patient’s condition changes.

- An arteriogram may be done to look for vasospasm.