

Arteriovenous Malformation

What is AVM?

An arteriovenous malformation or AVM for short, is a group of blood vessels that are abnormally interconnected with one another. AVMs can occur in different organs of the body but brain AVMs are the most problematic. Another term for AVM is "arteriovenous fistula."

What are the symptoms of disease?

About half the patients discover they have an AVM only after they suffer a brain hemorrhage. The other half are affected by seizures, headaches and stroke symptoms such as hemiplegia or hemiparesis

How is it diagnosed?

Often an AVM is suspected by an expert radiologist with just a CT scan of the brain. Most physicians however, feel more comfortable diagnosing AVMs with MRIs. AVMs are often missed in non-invasive imaging. For final diagnosis and evaluation cerebral angiography is mandatory. In cases where bleeding has occurred, the AVM can be completely obscured by intracerebral bleeding, requiring a cerebral angiogram to establish a final diagnosis.

Why does it develop?

Brain AVMs affect about 0.1% of the population and are present at birth, but they rarely affect more than one member of the same family. They occur roughly equally in men and women. AVMs are thought to occur due to abnormal development of blood vessels in utero and may be present since birth. An AVM is not a cancer and does not spread to other parts of the body. Dural AVFs in adults are an acquired disorder that can occur probably after thrombosis of dural sinuses.

How is it treated?

There are 3 main treatments. Endovascular embolization, micro neurosurgical excision and radiosurgery. These are given as standalones or in combination. Which one would suit a patient more is decided by a panel of experts after discussing detailed clinical and radiological data. Doctors recommend the best treatment, which is determined by the size of the AVM and its location. It is not uncommon to recommend a combination of treatments.

- **Embolization**

Under general anaesthesia a small catheter is advanced from the groin into the brain vessels and then into the AVM. A liquid, non-reactive material (onyx) or glue is injected into the vessels which block the AVM off. There is a small risk to this procedure and the chances of complete cure of the AVM depends on the size of the AVM. It is frequently combined with other treatments such as radiation or surgery or it can be staged in multiple sessions

- **Radiation Treatment**

This treatment is also known as Radio surgery or Stereotactic radiotherapy. A narrow x-ray beam is focused on the AVM such that a high dose is concentrated on the AVM with much lower dose delivered to the rest of the brain. This radiation causes the AVM to shrivel up and close over a period of 2-3 years, in up to 80% of patients. The risk of complications is low. Until the AVM is completely closed off, the risk of bleeding still persists. This treatment can only be performed in small size AVMs.

- **Surgery**

This is the oldest method for treating AVMs. The AVM is surgically removed in an operating room under general anesthesia. Since AVMs do not grow back, the cure is immediate and permanent if the AVM is removed completely. The risks of surgery are considered to be high for AVMs that are located in deep important parts of the brain with key functions. Surgery is usually indicated in those patients who are bled with large hematoma or the AVM is superficial and in non eloquent part of the brain

Are there any alternatives?

Other than the above mentioned treatments there are no alternatives available.

Only other alternative is to monitor the AVM. Doctors may recommend observation if they feel that treatment cannot be offered safely or when an AVM is discovered at a very late age.

What will happen if it is left untreated?

There is risk of bleeding at the rate of 1-2 % per year after diagnosis. Risk is much more if the AVM has bled or has a weak spot such as aneurysm. Cumulative risk of bleeding is high depending upon life expectancy.