

BRAIN ARTERIOVENOUS MALFORMATIONS

Arteriovenous Malformation (AVM)

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Description

Brain Arteriovenous malformations (AVMs) are congenital abnormalities of blood vessels, in which arteries and veins connect directly, resulting in high pressure arterial blood flowing into fragile cerebral veins without the buffer of capillary vessels. The fragile vessels pose a high risk of haemorrhagic stroke. AVMs form accidentally prior to birth. An AVM can form almost anywhere in the brain, brainstem, or spinal cord, but they are commonest in the main cerebral hemispheres. An AVM near or on the outer surface of the brain can cause bleeding there (a subarachnoid haemorrhage); if deeper, it can cause bleeding inside the brain itself (intracerebral haemorrhage) – forms of haemorrhagic stroke. (See Stroke)

The haemorrhage may be large or small, and depending on the extent and location of the bleed, damage to brain tissues may be fatal or disabling, or relatively slight.

AVMs occur in approximately 3 of every 10,000 people. They appear rarely in several generations of the same family, and are more common in men. Bleeding from an AVM most often occurs between the ages of 10 and 30.

The most common symptoms of AVM (as those of haemorrhagic stroke) are:

- Sudden and severe headache, which may be localized or general, or resemble migraine headache in some cases
- Vomiting occurring with headache
- Vision changes including decreased, double or blurred vision
- Seizures (fits)
- Muscle weakness in any part of the body
- Decreased sensation in any part of the body
- Sleepiness, lethargy, disorientation, irritability
- Stiff neck

Treatment

A bleeding AVM is a medical emergency and requires immediate hospitalization.

The goal of treatment is to prevent further complications by limiting bleeding, controlling seizures and, if possible, removing the AVM.

The main types of treatment are

- Surgery is the preferred treatment for small, superficial AVMs and provides immediate protection from haemorrhage, but carries a risk of perioperative death or disability.
- Endovascular treatment is the injection of occluding substances via a catheter directly into the feeding arteries. However, it is very hard to completely block all the blood supply to the

AVMs by this method. This technique is usually used to facilitate surgery rather than attempt cure.

- Radiosurgery is the delivery of a single, focussed, large dose of radiation to an AVM and induction of vascular occlusion. Unfortunately, there is a delay to complete occlusion of 2 – 3 years after treatment. Another limit of radiosurgery is that radiodamage to surrounding normal brain is unacceptably high when treating AVMs larger than 10 mL.

Often these treatments will be used in combination.

AVMs that haemorrhage can lead to serious neurological problems, and sometimes death. However, some people have AVMs that never cause problems.

Prognosis

The expected outcome varies. Approximately 10% of cases which have haemorrhage as the first symptom are fatal. Seizures and neurologic changes may be permanent or may resolve with treatment.

Possible complications which may occur are:

- Intracerebral haemorrhage
- Subarachnoid haemorrhage
- Seizures
- Permanent neurologic changes such as paralysis or sensory problems
- Numbness of a part of the face or body
- Vision changes
- Language difficulties
- Persistent headache
- Hydrocephalus (A build-up of fluid in and around the brain and spinal cord.)

Appropriate treatment will assist in full or partial recovery from most of these.