

# Glossary of terms

**Angiography suite:** Operation theatre used for endovascular procedures.

**Arteriovenous Malformation (AVM):** A tangle of abnormal vessels connecting arteries and veins.

**Catheter:** A thin flexible tube for insertion into a blood vessel through which devices can be introduced or contrast dye can be injected.

**Cerebral Angiogram:** A study showing arteries and veins in the brain by injecting contrast through a catheter and taking pictures using x-ray.

**Coils:** Small platinum coils used to occlude (fill) aneurysms. Coils are attached to a wire that is fed through a catheter and into the aneurysm.

**Craniotomy:** Surgical procedure where a section of skull is temporarily removed.

**Embolisation:** Blockage of a blood vessel or aneurysm so blood can no longer flow through.

**Endovascular:** Within the vascular system (arteries and veins).

**Interventional Neuroradiologist (INR):** A doctor specifically trained to treat vascular diseases in the brain using minimally invasive endovascular techniques.

**Radiotherapy:** A procedure using a radiation beam.

**Subarachnoid Haemorrhage (SAH):** Bleeding into the compartment surrounding the brain, often caused by the rupture of an AVM.



**Dr Brendan Steinfert**  
After finishing training as a Specialist Radiologist at Royal North Shore Hospital in 2004, Dr Steinfert undertook two Interventional Neuroradiology Fellowships, initially at Royal North Shore Hospital and secondly at The National Hospital of Neurology and Neurosurgery, Queens Square, London. Dr Steinfert has been a clinical consultant since 2006.



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After finishing Specialist Radiology training at Royal North Shore Hospital in 1999, Dr Faulder commenced an Interventional Neuroradiology Fellowship at Royal North Shore and completed it at Mount Sinai Hospital, New York. Dr Faulder has been a senior INR consultant since 2001.

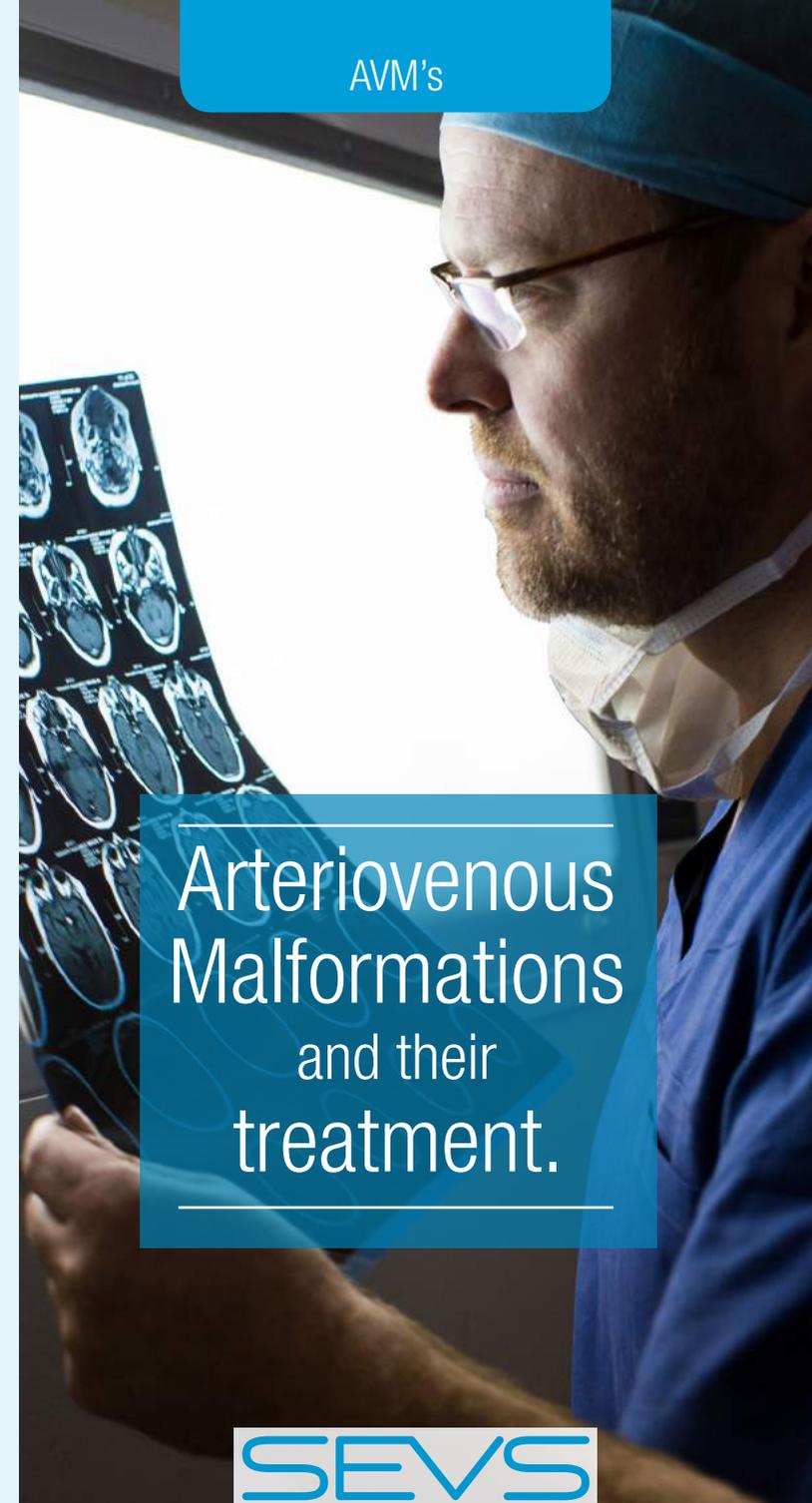
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Arteriovenous  
Malformations  
and their  
treatment.



# What are Arteriovenous Malformations?

A brain arteriovenous malformation (AVM) is a cluster of abnormal vessels in which arteries connect directly to veins with no intervening capillary bed. Without these capillaries the blood moves too quickly and under high pressure, which can cause bleeding.

AVM's can vary in size and location.

The risks and decision to treat a brain AVM depends on a number of variable factors.

These include whether the AVM has bled, whether the AVM is near to or involving very important brain structures, how large the AVM is, if the AVM is causing symptoms and the age of the patient.

The cause of AVM's is unknown, although they are thought to be due to abnormal development of blood vessels in utero and may be present since birth.

## Ruptured Brain AVM's

When a brain AVM ruptures, it usually causes bleeding into the brain or the space closely surrounding the brain.

This is called a subarachnoid haemorrhage (SAH). Blood can irritate, damage, or destroy nearby brain cells. Ruptured brain AVM's cause a haemorrhagic stroke.

## How is an AVM treated?

AVM's can be treated by surgery, radiotherapy, embolisation or any combination of these three techniques. A ruptured AVM usually needs to be treated due to the high risk of rebleeding.

**Surgery:** This is performed by doing a craniotomy (opening the skull surgically) and removing the AVM with microsurgery.

**Radiotherapy:** A beam of radiation is focused on the AVM, these vessels gradually reduce in size and close off. Treatment can take six months to three years. Radiotherapy works best for AVM's that are small and difficult to treat surgically.

**Embolisation:** Embolisation is a technique of blocking the abnormal vessels with a small amount of glue type substance. This is a minimally invasive treatment performed by an Interventional Neuroradiologist under general anaesthesia.

A small tube or catheter is introduced into an artery in the groin and navigated all the way into the arteries supplying the AVM.

The glue is then injected into the AVM using live imaging in the angiography suite. These procedures typically take 2 to 4 hours.

On some occasions more than one session is required.

Embolisation is often performed before surgery to minimize blood loss, making the operation shorter and safer.

**After Embolisation:** AVM embolisation typically requires an overnight stay in ICU with observation on the ward for 3 days following this. On discharge, strenuous activity should be avoided for a week as well as driving.

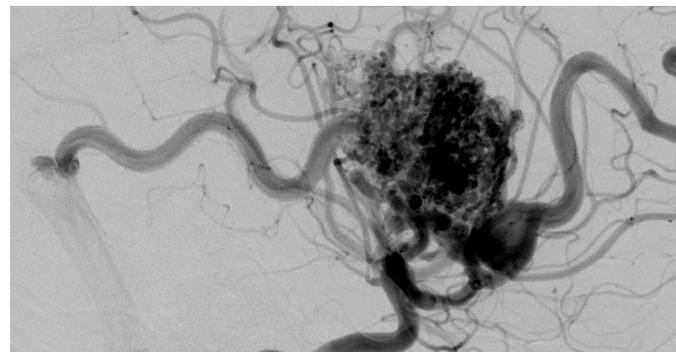
If open surgery is used in conjunction with embolisation an increased hospital stay will be required and recovery will take longer.

## About your treatment

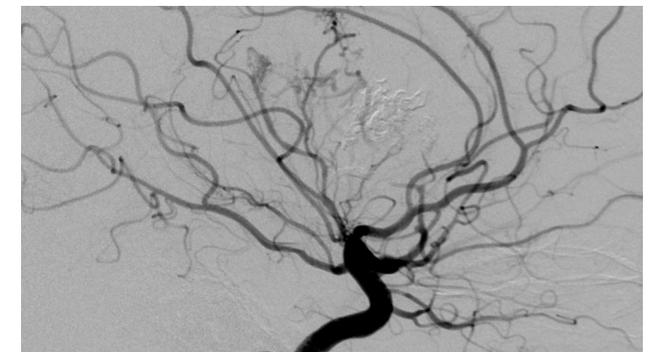
Before treatment, an INR specialist will discuss the risks and benefits of each treatment option and recommend what is best for you.

Our doctors work with the neurosurgeons and make decisions about the safest way to treat these lesions in consultation with the surgeons. AVM treatment is improving as medical technology improves, but they remain difficult lesions to manage.

The treatment of some AVM's may carry too high a risk and some patients may be better off not having any form of surgery.



An AVM before embolisation.



An AVM after embolisation.