



## SAH Vasospasm Endovascular Treatment

### What is SAH Vasospasm Endovascular Treatment?

Subarachnoid haemorrhage (SAH) is the release of blood into the space around the brain that contains fluid. It is within this space that the main arteries supplying blood to the brain are located before they enter the brain.

SAH usually comes from a ruptured (burst) aneurysm on an artery. An aneurysm is a fluid-filled sac in the wall of an artery that can weaken the wall. The presence of blood in the fluid around these arteries can cause temporary narrowing (or vasospasm) to develop in the arteries. Vasospasm usually happens somewhere between 5-10 days after the initial blood loss (or haemorrhage) from the burst aneurysm.

When the arteries become narrowed due to vasospasm, there may be a decrease in the flow of blood to the parts of the brain supplied by arteries affected by the narrowing. If all of the blood vessels supplying the brain are narrow, it can cause drowsiness, confusion, or even unconsciousness (coma). When only some of the arteries are involved, the problems are less severe, including weakness of an arm or leg, difficulty speaking, vision loss, or trouble walking.

If you have been diagnosed with SAH and admitted to hospital but no vasospasm has developed, your hospital medical team will take measures to prevent vasospasm.

When vasospasm has developed, you will be given medical treatment and interventional radiology treatments. If the medical treatments have not worked, or have only partially worked you may be referred for an interventional radiology procedure called endovascular treatment.

Interventional radiology is minimally invasive and uses X-ray or ultrasound images to guide procedures, usually done with tiny instruments through small plastic tubes called catheters inserted through an artery or vein. These

procedures are performed by specialist doctors called interventional or neurointerventional radiologists, or by neurosurgeons or neurologists.

SAH Vasospasm Endovascular Treatment is performed in an angiography suite (or room) of a hospital, which looks like an operating theatre. Angiography is the X-ray examination of blood vessels after a dye (or contrast medium) has been injected into the bloodstream that shows up on live X-ray pictures or images used to diagnose any abnormalities.

Contrast medium (see Iodine-containing contrast medium (ICCM)) is a liquid substance injected into an artery or blood vessel and, if you have a suspected SAH, the contrast will clearly show on the X-ray images. It can be more clearly seen if the blood vessels are narrowed. Sometimes ultrasound scans can be used to show whether there is vasospasm.

Sometimes computed tomography (CT) and ultrasound tests may be done to detect the vasospasm before it causes symptoms (this is called “screening”) and may allow appropriate treatment for the vasospasm to be given at an earlier stage. It is important to detect vasospasm because if it is severe or long lasting, it can lead to damage (or infarction) of the part of the brain that the narrowed vessels would normally supply blood and oxygen to. When the vessels are narrowed, not enough blood gets to the part of the brain that they supply to keep it working normally, and eventually you will notice that you are unable to do the things that that part of the brain is responsible for, such as walking, talking, or moving your limbs. If the vasospasm is not treated, these problems can become permanent.

## **How do I prepare for SAH Vasospasm Endovascular Treatment?**

SAH is suspected in people who experience the sudden onset of a very severe headache, often described by those who have had it as the worst headache of their life. If this happens you will normally go to hospital or see your doctor. If SAH is suspected, an urgent CT scan of your brain will usually be done to confirm this suspicion or to rule it out as the cause for the headache.

If you are confirmed to have SAH, you will be carefully monitored for the development of any complications. The major complications of SAH are expansion of the fluid containing spaces inside the brain (ventricular dilatation or “hydrocephalus”), as well as vasospasm. If your SAH is particularly severe, you may collapse and be unconscious. If you develop a focal weakness, such as weakness in the face, an arm or leg, problems with speech or vision, or become drowsy, tests will be done to detect if it is due to developing vasospasm.

These tests may include CT scanning of your brain using a contrast medium.

There is no specific preparation for SAH Vasospasm Endovascular Treatment because you will normally have presented at a hospital or medical centre with a severe headache and be provided with hospital treatment.

## **What happens during SAH Vasospasm Endovascular Treatment?**

If you have been diagnosed with SAH and admitted to hospital but no vasospasm has developed, your hospital medical team will take measures to prevent vasospasm.

When vasospasm has developed, you will be given medical treatment, usually medication given through an intravenous drip (injected directly into a vein) and interventional radiology treatments.

If the medical treatments have not worked, or have only partially worked, you may be referred for an interventional radiology procedure called endovascular treatment.

You will be moved onto an angiography table (a special bed that allows you to be X-rayed at different angles during the procedure) in an angiography suite. You may be under a general anaesthetic (fully asleep).

A needle will be placed into the large artery in your groin at the top of your thigh and a thin plastic tube (a catheter) is then put into the tiny hole in the artery made by the needle. The catheter is guided into the arteries in the brain using the X-ray images. Iodine dye or contrast medium (see Iodine-containing contrast medium (ICCM)) is injected through the catheter to fill the brain arteries and make them visible on the X-ray pictures (these pictures are called an angiogram). The interventional radiologist, neurosurgeon or neurologist will then look at the pictures to confirm whether or not vasospasm is there and how severe it is. This allows your correct treatment to be planned.

Vasospasm is treated by injecting medication (including verapamil or nimodipine) into the catheter, which is positioned very close to the narrowed artery, to reverse the spasm. Alternatively, a tiny balloon will be inserted through the catheter and into the artery to stretch open the artery (angioplasty). In some cases, both balloon treatment and medication to reverse the spasm may be given at the same time.

The effect from successful balloon angioplasty may last longer, but the balloon may not be able to reach some of the smaller arteries. Using the balloon has more risks than using medical treatment alone (see “Risks”

below), but may succeed in reversing the vasospasm and avoiding a stroke when medical treatment alone is failing.

## **Are there any after effects of SAH Vasospasm Endovascular Treatment?**

There are no specific after effects of SAH Vasospasm Endovascular Treatment.

Occasionally the vasospasm may come back and more than one treatment can be required over a period of several days.

There are risks from having the treatment and these are discussed below.

## **How long does a SAH Vasospasm Endovascular Treatment take?**

Normally, the total procedure will take 1-2 hours but it can take longer if the patient is in intensive care, on a ventilator, or a general anaesthetic is required.

## **What are the risks of a SAH Vasospasm Endovascular Treatment?**

Untreated vasospasm causing the symptoms described above (see “What is SAH Vasospasm Endovascular Treatment?” above) has a high risk for causing permanent brain damage, and even death. The endovascular interventional radiology treatment aims to avoid or minimise this but is associated with risks of its own.

There are risks associated with angiography including:

- The groin artery puncture may cause bleeding (haematoma).
- Damage to the artery the catheter is inserted into.
- Local infection at the puncture site.
- The contrast medium can cause allergies or kidney function impairment (see Iodine-containing contrast medium (ICCM)).
- The catheter placement into the arteries to the brain can cause stroke, artery damage, or seizures.
- The medication used to treat the vasospasm may lower the blood pressure causing a stroke or cardiac ischemia, and has been associated with increased pressure inside the head that can cause further neurological problems such as loss of consciousness.

These problems are not very frequent.

Balloon angioplasty can tear the lining of very small arteries (1-2mm) as the balloon is expanded in them and this can lead to a stroke, or the balloon can tear the full thickness of the artery, which causes a further SAH. This further SAH can be fatal. The risks of these major types of complications from angioplasty are estimated at 5-10%.

Stroke and death are the major risks of treatment, and overall these risks are estimated at 5-10%. This will depend on whether medication alone is used and the vasospasm is mild (2-3% estimated risk of major complications), or if multiple vessels are affected requiring both drug and angioplasty treatment (5-10% risk of major complications).

## **What are the benefits of a SAH Vasospasm Endovascular Treatment?**

The goal is to avoid or minimise the onset of delayed neurological problems secondary to the brain damage caused by vasospasm. In severe cases of SAH, this is responsible for nearly one third of the serious complications associated with SAH. Much of the treatment given is directed to preventing or treating a stroke that may result from the vasospasm once the aneurysm has been secured, to prevent it from bleeding.

The success of endovascular treatment of SAH vasospasm is often immediately apparent.

The chances of surviving with good quality of life after SAH and vasospasm are significantly improved with modern treatment, including angioplasty and intra-arterial drug injections.

## **Who does the SAH Vasospasm Endovascular Treatment?**

The endovascular treatment of vasospasm after SAH is usually performed by neurointerventional endovascular specialist doctors or neurointerventional radiologists, sometimes neurosurgeons, or neurologists trained in neurointerventional radiology.

## **Where is a SAH Vasospasm Endovascular Treatment done?**

Most patients with SAH are treated in an angiography suite or room at large specialist public hospitals by specialist neurointerventional doctors working as part of a multidisciplinary team. This is usually in large public hospitals in major cities, although some private hospitals do treat SAH patients.

## When can I expect the results of my SAH Vasospasm Endovascular Treatment?

This is an interventional procedure and the results are improvements in the problems caused by the vasospasm. Usually, the success of the procedure will be evident within a matter of minutes or hours, demonstrated by the symptoms going away or improving. Further treatments may be needed as vasospasm can recur, but repeat treatment is not an indication that the first treatment was not successful.

Page last modified on 26/9/2016.

### Related articles

---

RANZCR® is not aware that any person intends to act or rely upon the opinions, advices or information contained in this publication or of the manner in which it might be possible to do so. It issues no invitation to any person to act or rely upon such opinions, advices or information or any of them and it accepts no responsibility for any of them.

RANZCR® intends by this statement to exclude liability for any such opinions, advices or information. The content of this publication is not intended as a substitute for medical advice. It is designed to support, not replace, the relationship that exists between a patient and his/her doctor. Some of the tests and procedures included in this publication may not be available at all radiology providers.

RANZCR® recommends that any specific questions regarding any procedure be discussed with a person's family doctor or medical specialist. Whilst every effort is made to ensure the accuracy of the information contained in this publication, RANZCR®, its Board, officers and employees assume no responsibility for its content, use, or interpretation. Each person should rely on their own inquiries before making decisions that touch their own interests.