What to expect after having a subarachnoid hemorrhage (SAH)

Information for patients and families
Table of contents

What is a subarachnoid hemorrhage (SAH)? .................................................. 3

What are the signs that I may have had an SAH? ........................................ 4

How did I get this aneurysm? ...................................................................... 4

Why do aneurysms need to be treated? ....................................................... 4

What is an angiogram? .................................................................................. 5

How are aneurysms repaired? ...................................................................... 6

What are common complications after having an SAH? ............................ 8

What is vasospasm? ..................................................................................... 8

What is hydrocephalus? ............................................................................... 10

What is hyponatremia? ............................................................................... 12

What happens as I begin to get better? ....................................................... 13

What can I expect after I leave the hospital? ............................................. 13

How will the SAH change my health? ......................................................... 14

Will the SAH cause any long-term effects? ................................................. 14

How will my emotions be affected? .............................................................. 15

When should I get help? ............................................................................. 16

Frequently asked questions ........................................................................ 17

Do you still have questions? ........................................................................ 19
What is a subarachnoid hemorrhage (SAH)?

An SAH is a type of stroke. It is usually caused when a brain aneurysm bleeds, but can also be caused by trauma and other reasons. This booklet will focus on subarachnoid hemorrhages caused by an aneurysmal rupture.

An aneurysm is a weak spot on a blood vessel. It bulges out and looks almost like a thin balloon. The constant pressure of blood flow can cause areas of weakness in the blood vessel to enlarge. The aneurysm can grow over time and become weaker as it grows.

Aneurysms can break and bleed for a short time, until a clot forms.

Aneurysms usually develop at the branching points of the arteries in the brain. Most brain aneurysms are deep in the head, at the base of the brain.

There are 3 layers of protective tissue between the skull and the brain. One of these layers is called the arachnoid mater. Arteries that bring blood to the brain are under the arachnoid mater. They are in the subarachnoid space. Bleeding from these arteries is called a subarachnoid hemorrhage (SAH).
What are the signs that I may have had an SAH?

- Sudden, severe, worst headache of your life
- Pain and stiffness in your neck
- A sudden change in your vision or speech
- Unexplained weakness in your arms or legs
- Light hurts your eyes
- Feeling very drowsy and unable to stay awake
- Seizure
- Nausea or vomiting

How did I get this aneurysm?

Nobody knows exactly what causes brain aneurysms. Aneurysms can happen anywhere in the body. Some people can have more than one.

You are more likely to have brain aneurysms if you:

- Smoke
- Have high blood pressure
- Are female (women are at higher risk than men)
- Have a family history (2 or more people in your immediate family have brain aneurysms)

Why do aneurysms need to be treated?

Aneurysms that bleed are likely to bleed again. A ruptured aneurysm must be repaired to stop it from bleeding again. Repairing the ruptured aneurysm will not fix the brain damage already caused by the bleeding.
**What is an angiogram?**

An angiogram is a test used to study blood vessels and understand more about your aneurysms. Doctors need to do angiograms before they can repair aneurysms. Images from the test are used to decide how to treat the aneurysms.

Angiograms are done by a specialist doctor called an interventional neuro-radiologist.

**How is an angiogram done?**

We put a small soft tube (called a catheter) in an artery in your groin. The catheter is moved up into the blood vessels of your neck and brain. The doctor injects dye into the tube to use x-rays to study each blood vessel.

The dye travels into the blood vessels of your brain. The doctor takes a series of x-rays as the dye passes through the blood vessels. A team of specialist doctors uses these x-rays to decide what treatment is best for you.
How are aneurysms repaired?

There are different types of aneurysms. Your doctor will decide on the best treatment for your aneurysm.

Types of aneurysm

- Fusiform aneurysm
- Saccular aneurysm
- Saccular and fusiform aneurysm
- Pseudo aneurysm

There are 4 common treatments to repair aneurysms:

- Endovascular coiling
- Surgical clipping
- Vessel sacrifice
- Flow diversion stents
What is endovascular coiling?

Endovascular coiling is a procedure done in the angio suite. For this treatment you will have a general anesthetic (be put to sleep). The doctor will put a soft tube (catheter) in your groin artery and guide it into the aneurysm in your brain. They will fill the aneurysm with soft coils made of platinum. When the coils are in place, this stops blood from entering the aneurysm and prevents further bleeding.

What is clipping?

Clipping is a treatment that uses a metal clip to cut off the aneurysm from the blood vessel. The surgeon puts a clip onto the aneurysm where it bulges out of the healthy blood vessels. The clip repairs the aneurysm by keeping blood out of it.

What is vessel sacrifice?

Vessel sacrifice is a treatment that cuts off the flow of blood to the vessel that has an aneurysm. The aneurysm will not bleed because there will be no blood flowing near the aneurysm. Your brain has many blood vessels so it will get enough blood even with that one vessel cut off.

What is flow diversion?

Flow diversion is a treatment to divert the flow of blood away from the aneurysm. For this treatment the doctor will put a small mesh tube (a stent) into the blood vessel with the aneurysm. The tube will divert the flow of blood away from the aneurysm. Over time the aneurysm will close. The small tube will stay in the blood vessel for the rest of your life. When a stent has been placed you will need to be on medication to thin your blood to prevent a clot from forming.
What are common complications after having an SAH?

There are 3 common complications that can happen after a SAH:

- Vasospasm
- Hydrocephalus
- Hyponatremia

What is vasospasm?

Vasospasm is when the blood vessels in your brain become more narrow. It is also called delayed cerebral ischemia. Those blood vessels can become narrow due to a biochemical reaction from the bleeding. If the blood vessels are narrow, the flow of blood to the brain can slow or stop. This may cause a stroke or serious life-threatening conditions. Vasospasm usually happens 3 to 14 days after the SAH. Not everybody has vasospasm and its effects can be mild or severe.

How does the medical staff know if I have vasospasm?

If you have vasospasm, your medical team may notice neurological changes such as:

- Being more drowsy
- New confusion
- Being more restless
- New weakness in your limbs or face
- Difficulty speaking
What medical tests can diagnose vasospasm?

1. **Neurological test.** When you are most at risk the nurse will check you for signs of vasospasm. This may mean that for a few days the nurse will wake you up every hour. They will ask you simple memory questions, ask you to move your arms and legs and look in your eyes.

2. **TCD (Trans-Cranial Doppler).** A TCD is an ultrasound that looks at the blood flow in your head. This test is done while you are in the ICU.

3. **CTP (CT Perfusion).** A CTP is a scan of your brain, its blood vessels and the blood flow to the brain.

How is vasospasm treated?

The medical team will treat the vasospasm with medicine, fluids or even angiogram procedures.

- Your doctor may prescribe nimodipine for you. You may take it for up to 21 days. Nimodipine helps protect your blood vessels from vasospasm.

- Your doctor may increase your blood pressure with medicine and fluids. High blood pressure helps controls vasospasm by pushing the blood vessels open.

- Certain medicines help to open the arteries. In the ICU these medicines are given through an intravenous (IV). The medical team will want to keep your fluids at a normal level, meaning they do not want you to be dehydrated or over-hydrated. They will monitor what you eat and drink and how much you urinate.

- Sometimes, vasospasm is treated with an angiogram. You may get an angiogram to put the medicine directly into the arteries in your brain. Or doctors may try to re-open the narrowed artery with an angioplasty. This means that the doctor puts a tiny balloon into the artery and gently inflates the balloon to open it.
What is hydrocephalus?

Hydrocephalus is when cerebrospinal fluid (CSF) builds up in the brain. Hydrocephalus can happen when blood from a ruptured aneurysm leaks into the CSF. The blood can stop the brain from absorbing the CSF normally.

CSF surrounds the brain and spinal cord. CSF brings nutrients to the brain and also protects the brain. The brain constantly makes and reabsorbs CSF. When someone has hydrocephalus their brain does not absorb the CSF properly. This can cause a build-up of fluid in the brain. Very high pressure inside the brain can cause brain damage.

How is hydrocephalus treated?

To treat hydrocephalus the doctor puts a drain in your head to take out the extra CSF and the blood from the ruptured aneurysm. Doctors also use the drain to measure the pressure inside your head. The drain is called an external ventricular drain (EVD).

Sometimes the hydrocephalus gets better on its own when the blood clears and the brain is once again able to absorb the CSF. When it does, the doctor will remove the EVD.
What is ventriculoperitoneal shunt surgery?

If hydrocephalus does not get better you will need a ventriculoperitoneal shunt or VP shunt. The purpose of the shunt is to drain the CSF building up in the brain. For this surgery you will have a general anesthetic (be put to sleep). The surgeons make a small hole in the skull and place a small catheter into the ventricles where CSF is stored. They will place the catheter under the skin behind your ear. They will run the other end down to the belly. When pressure in the brain starts to rise, a valve attached to the catheter drains CSF. When the valve opens the fluid drains into your belly and is absorbed by the body.

After surgery, your head, neck or belly may be tender. There will be a lump on your head where the valve is. There will be staples just behind your ear and on your belly. These staples will be removed after 10 to 14 days.
**What is hyponatremia?**

Hyponatremia is when the level of salt in your blood is too low. When the brain is hurt, it may let out too much salt. Low blood salt levels can affect your recovery. Your doctor will monitor your blood salt levels.

**How is hyponatremia treated?**

To treat your hyponatremia your medical team may:

- Give you high-dose salt through an IV (intravenous)
- Limit how much you drink
- Give you salt pills
- Give you medicine to stop you from losing too much salt when you urinate (pee)
What happens as I begin to get better?

In the beginning, you may be in the intensive care unit (ICU). When you are medically stable, you can be moved to another unit in the hospital. Once you no longer need to be at St. Michael Hospital you may be sent home, transferred to a hospital closer to home or transferred to a rehabilitation facility.

What can I expect after I leave the hospital?

Your first follow-up appointment is usually about 6 to 8 weeks after your SAH. The Neurovascular clinic will contact you with the day and time of your appointment. If you have questions about your appointment, please contact the Neurovascular clinic listed on your discharge summary.

After you leave the hospital you will need follow-up with one or more of these tests:

- MRI or MRA
- CTA
- Angiogram
How will the SAH change my health?

Will the SAH cause any long-term effects?

The brain heals slowly. The recovery period is different for each person. Your recovery time can be as short as a few weeks or as long as many months.

Life after an SAH may be very different, and you may notice difficulties that do not go away quickly. The SAH may have caused damage to your brain. In time, your body will clear out the SAH but some of the damage to your brain could affect you permanently.

After your SAH you may have some physical and mental challenges. Most of these challenges will go away with time. Other challenges may stay with you for many years. Many SAH patients face similar difficulties. You are not alone.

Please let your healthcare team know if you have these common side effects:

- Headache
- Back and neck pain
- Fatigue
- Memory loss
- Constipation
- Hair loss
How will my emotions be affected?

You may have strong emotions because the SAH was so sudden and the physical recovery was so long. These feelings are normal. Emotional recovery starts with being aware of how you are feeling.

- You may be feeling a sense of **grief**. Many things that are important to you may be on hold. Grief is a normal reaction to loss. You have survived a traumatic illness and its effects may still be with you. It is normal to feel some form of loss.

- You may feel **sad** or have low energy. You may feel like crying or want to be alone. Feeling sad or down is a very normal human response to being sick. It is part of the healing process.

- You may be **afraid**. You could be concerned about whether your life will return to normal, how your family is coping or how you will manage. These concerns can be stronger if your SAH caused physical or mental challenges.

- You may feel cranky and irritable. It is very common to feel **angry** with the people closest to you.

- Your family and friends may also feel sad, anxious and angry.

- You may also feel disbelief, confusion, loneliness, frustration, resentment, panic or bitterness. These emotions are normal.

Your emotions need to heal just like your body. If you try to push away or deny these normal emotions, your recovery may take longer or your emotional problems could get worse. Talk to your doctor if you are having these feelings. The medical team can help you deal with your thoughts and feelings.
When should I get help?

Strong emotions are normal. They usually heal over time. But negative emotions can be hard to handle.

You may not notice that you are depressed or that you are having trouble with your emotional recovery.

Ask for help if you have any of the following symptoms for more than a few weeks:

- Your sleep patterns are different
- You do not feel like eating
- You have lost interest in things that were important to you before
- You feel worthless
- You are thinking about death a lot
- You feel ongoing tension and stress with your family or loved ones
Frequently asked questions

I have an aneurysm. Will my family or children get one?

Some aneurysms may be genetic. Tell your doctor if 2 or more people in your immediate family have an aneurysm.

What can I do to make sure I do not have another aneurysm?

Monitor your blood pressure and avoid hypertension. If you smoke, you should try to quit. High blood pressure and smoking increase your risks for aneurysms.

Will I need long-term follow-up now that my aneurysm is repaired?

You will come back to see the doctor 6 to 8 weeks after you leave the hospital. Your doctor will decide when your next follow up appointment will take place.

Can I wash my hair?

If you have drains or monitors attached to your head, ask your nurse about how you can wash your hair.

How long do the clip, coils or stent stay in my head?

The clip, coils or stent will never be taken out.

Will the clip or coils move?

A clip will rarely move. Sometimes coils become packed down. Your doctor will monitor the aneurysm and check placement of the clips or coils.
Will my clip or coils make security alarms at the airport go off?
No, the material will not trigger security alarms.

Can I have a MRI or CT scan with an aneurysm clip or coils?
Most clips and coils are now compatible with MRIs and CTs. Ask your doctor to confirm that your clip or coils are MRI-compatible.

When should I get medical help?
Call 911 if you:

- Have a sudden, explosive headache
- Feel confused
- Have trouble waking up
- Have seizures

I still have an aneurysm that has not been repaired. Should I be worried?
Fixing an aneurysm has many risks. Sometimes fixing the aneurysm is more risky than leaving it alone. If you have an aneurysm that was not repaired, your doctor will follow up to check on it. Your medical team will recommend that you keep a healthy blood pressure and do not smoke.
Do you still have questions?

We hope this booklet has answered some of your questions about subarachnoid hemorrhage. If you have other questions, write them down here. Ask your medical team. They will do their best to answer your questions.

My questions:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________