

Bleeding in the brain – haemorrhagic stroke

Most strokes are caused by a blockage in an artery leading to the brain – an ischaemic stroke. However, about 15 per cent are due to bleeding in or around the brain. These are called haemorrhagic strokes. This factsheet explains the different types of stroke caused by bleeding and how they are diagnosed and treated. It also lists sources of further information and support and a glossary.

Blood from the heart is pumped around the body through a network of blood vessels (called arteries). This blood contains vital oxygen and nutrients. **If a blood vessel in or around the brain bursts it can cause bleeding, which is called a haemorrhagic stroke.**

There are two main types:

- bleeding within the brain (called an intracerebral haemorrhage)
- bleeding on the surface of the brain (called a subarachnoid haemorrhage).

Bleeding within the brain

When an artery inside the brain bursts it is called an intracerebral haemorrhage.

About 10 per cent of all strokes are of this type. Because the blood leaks out into the brain tissue at high pressure, the damage caused can be greater than the damage caused by strokes due to a blockage.

Symptoms

Symptoms of a stroke caused by bleeding in the brain can include weakness, numbness

and/or pins and needles on one side of the body, difficulty speaking or understanding, dizziness, or blurred vision. These can be accompanied by other symptoms such as a sudden, severe headache, altered consciousness, vomiting or a stiff neck.

Bleeding on the surface of the brain

The brain itself sits inside a cushion of membranes that protects it from the skull. Between two of the layers of membranes is a space called the subarachnoid space that is filled with cerebrospinal fluid (CSF). **If blood vessels near the surface of the brain burst and blood leaks into the subarachnoid space, this is called a subarachnoid haemorrhage (SAH).** This accounts for five per cent of all strokes.

Subarachnoid haemorrhages are a very serious type of stroke and about 50 per cent of people who have one will not survive.

Symptoms

Often the only symptom is a **sudden, severe headache**. This is sometimes described as like 'being hit over the head with a hammer'

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resulting in a blinding pain unlike anything you have experienced before. Other symptoms can include altered, or loss of, consciousness, seizures, nausea and vomiting, sensitivity to light, neck stiffness (takes three to twelve hours to develop), confusion and fever. These symptoms may also be accompanied by speech problems and weakness on one side of the body.

What causes a haemorrhagic stroke?

High blood pressure

The main cause is high blood pressure (hypertension), which causes about two thirds of all strokes due to bleeding.

High blood pressure weakens the arteries and makes them more likely to tear. Risk factors for high blood pressure include being overweight, drinking alcohol in excess, smoking, a lack of exercise, and stress – which may cause a temporary rise in blood pressure. (See our factsheet *F6, High blood pressure and stroke* for more information.)

Cerebral amyloid angiopathy (CAA)

This is a condition where a protein called amyloid builds up inside the blood vessels in the brain. It causes damage which can cause the vessel to tear. This condition is more common among older people.

CAA often leads to bleeds in specific areas of the brain near to the surface (called lobar areas). Because of their position, blood can also leak into the subarachnoid space causing an SAH as well. One study found that in 63 per cent of these types of bleeds in the brain, blood also leaked into the subarachnoid space.

Aneurysm

An aneurysm is a **weak spot on an artery** that has ballooned out. Artery walls are usually thick and strong but the walls of an aneurysm are thin and weak because they have been stretched, and therefore they can burst easily. Aneurysms in the brain are sometimes called berry aneurysms because they look like a small berry.

Some aneurysms are present from birth.

There are also a number of **risk factors** that increase your chances of developing an aneurysm. These include smoking, high blood pressure, a family history of aneurysms, using cocaine, and having a genetic kidney condition called autosomal dominant polycystic kidney disease.

High blood pressure is the main cause of an aneurysm rupturing. A burst aneurysm is the most common cause of an SAH, causing about 85 per cent of cases.

Abnormal blood vessels

Sometimes people are born with abnormalities in their blood vessels. They are called **vascular malformations**, and are made up of a tangle of blood vessels or enlarged blood vessels. These malformations are rare and affect less than one per cent of the population. It is not known why some people are born with these malformations.

There are several different types, some of which can lead to bleeding in the brain if the thin vessel walls break. The most common ones are called arteriovenous malformation (AVM), arteriovenous fistula of the dura, cavernous malformation and developmental venous anomaly.

Medication

A haemorrhage can also happen if medication taken to prevent your blood from clotting is poorly controlled. These medicines are called **anticoagulants** and should be carefully monitored. They are commonly taken to reduce your risk of a stroke due to a blockage if you have a type of irregular heart rhythm called atrial fibrillation.

Illegal drugs

Some drugs, such as cocaine, irritate the blood vessel walls making them weaker and more likely to rupture.

How are strokes due to bleeding diagnosed?

Anyone with a suspected stroke should go to hospital immediately. A **brain scan** (a CT or MRI scan) should be carried out as soon as possible and within 24 hours to confirm the diagnosis of stroke. A brain scan should take place immediately if the symptoms include a severe headache or a low level of consciousness. The brain scan will also show what type of stroke it is – whether it was caused by a blockage or by bleeding.

In the case of an SAH, a **lumbar puncture** is usually carried out as well as a brain scan. This is a procedure to remove a sample of the cerebrospinal fluid that bathes the brain and spinal cord. It will show if any blood has leaked into this fluid.

An **angiogram** is also usually carried out to locate the burst blood vessel. A fine tube called a catheter is put into an artery and a dye is injected into the blood. X-rays are then used to find where the bleeding occurred.

How will I be treated?

Emergency surgery

Surgery is sometimes needed to remove any blood, to relieve any pressure that has built up or to repair the blood vessels. This is usually done with a procedure called a **craniotomy**. This operation should be carried out by a neurosurgeon.

During the operation, a small piece of your skull is cut away so the surgeon can access the cause of the bleeding. They can then repair any damaged blood vessels and ensure there are no blood clots that could restrict the flow of blood in your brain. If a blood clot has formed, it may be removed. After the bleeding has stopped, the piece of skull can be replaced.

After this type of operation, you may be placed on a ventilator (a machine to help you breathe). This gives your body time to recover and can help to control swelling in your brain.

With any type of bleed in or around the brain, the escaping blood can sometimes create a blockage that prevents the normal flow of cerebrospinal fluid. This can result in a build up of **fluid around the brain** (called hydrocephalus). This can cause pressure and pain, and if left untreated, can cause damage to the brainstem (the base of the brain which controls most of the automatic functions that keep us alive, like breathing). Surgery to drain away the excess fluid can be carried out using a shunt (a thin tube implanted into the brain).

Surgery to seal an aneurysm

If your stroke was caused by a burst aneurysm, an operation may be necessary to seal it and stop it bleeding again. Sometimes the operation can be done within a day or so of your stroke, but if you are unconscious or semi-conscious, the surgeons may wait until you are more stable before operating.

Coiling is the most common operation that is carried out to seal off an aneurysm. A fine tube is inserted into an artery in the groin and carefully steered up to the aneurysm near the brain. X-rays are used to guide the tube. On the tip of the tube is a platinum coil, which is released into the aneurysm. More than one coil is usually inserted. Blood then clots around the coil, sealing off the aneurysm.

Clipping involves opening the skull and making an incision in the membranes that protect the brain to get to the aneurysm. The surgeon will then put a metal clip around the base of the aneurysm so that no more blood can escape.

The choice of operation depends on various factors such as your health and the aneurysm's position. Coiling is becoming the preferred treatment option as it is less invasive and so causes fewer complications.

After the operation, you will usually stay in hospital for one or two weeks. You may then be well enough to go home, but may need to be transferred back to your local hospital for further treatment or rehabilitation.

Medication

You may be given **medication to lower your blood pressure**, which will reduce your risk of having another stroke due to bleeding.

If your bleed was **caused by anticoagulant medication**, you will usually be given another drug to reverse the effects as soon as possible.

After an SAH, blood vessels near the burst aneurysm can go into **spasm** and prevent blood from getting to the brain. Why this happens isn't clear, but a lack of blood supply can lead to further brain damage. To prevent this, you may be given a drug called **nimodipine** for about three weeks. After this time your risk of spasm disappears and your doctor will usually take you off the medication.

Pain relief such as morphine or paracetamol with codeine may be given to you to help with the severe headache associated with an SAH.

About five per cent of people develop **epilepsy** after an SAH. There are a range of different types of medication you may be given to treat it. See our factsheet *F24, Epilepsy after stroke* for more information.

Recovery

As with all types of stroke, **some people recover completely, but others need rehabilitation**. Problems with communication, mobility, continence, swallowing, memory, or extreme tiredness are all common. Specialists such as physiotherapists, speech and language therapists, occupational therapists and continence nurses should be available to help you with your recovery. We have publications covering the effects of stroke and the therapies that can help, contact us for copies.

It is quite common for people to experience

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headaches after any type of bleeding in the brain. This may be due to swelling or changes in the levels of cerebrospinal fluid. The pain tends to lessen over time and can usually be controlled by painkillers such as paracetamol. You should avoid taking aspirin after this type of stroke. Drinking plenty of water (two to three litres per day) and avoiding caffeine and alcohol can help to reduce these headaches.

Anyone experiencing a sudden, severe headache or a persistent headache should seek medical attention urgently.

Some people report **strange sensations** after an SAH, like running water or a tickling feeling on their brain. These are thought to be harmless and usually pass in time.

You should **have your blood pressure checked regularly** after a bleed in the brain, as high blood pressure is the main cause of another bleed.

If you have had an SAH, you will usually be advised to have check-ups for a few years to see if there are any more aneurysms which may need surgery.

If you have two or more first degree relatives (i.e. siblings or parents) who have had an SAH, you may also be advised to have a check-up and a type of MRI brain scan called an MRA scan. This is to check if you have an aneurysm as there is a slight hereditary risk.

Helping yourself

- Take any medication you are prescribed as directed by your doctor.
- Drink plenty of fluids.
- Eat healthily.

- Don't smoke.
- Don't drink too much alcohol.
- Have your blood pressure checked regularly.

Useful organisations

All organisations are UK wide unless otherwise stated.

Stroke Association

Stroke Helpline: 0303 3033 100

Email: info@stroke.org.uk

Website: stroke.org.uk

Contact us for information about stroke, emotional support and details of local services and support groups.

Blood Pressure Association

Information Line: 0845 241 0989

Website: www.bpassoc.org.uk

Has a wide range of information on high blood pressure, treatments and lifestyle.

Brain & Spine Foundation

Helpline: 0808 808 1000

Website: www.brainandspine.org.uk

Provides detailed information about neurological conditions and risk factors, including subarachnoid haemorrhage and vascular malformations of the brain. Their helpline is staffed by specialist nurses.

Brain and Spinal Injury Centre (Basic)

Helpline: 0870 750 0000

Website: www.basiccharity.org.uk

Provides information, support and advice by staff who have direct experience of brain injury.

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Headway – the brain injury association

Tel: 0808 800 2244

Website: www.headway.org.uk

Has information on strokes due to bleeding and aneurysms. They also have a network of local branches.

Scottish Head Injury Forum

Website: www.shif.org.uk

Provides information and support to people with brain injuries including stroke in Scotland.

Disclaimer: The Stroke Association provides details of other organisations for information only. Inclusion in this factsheet does not constitute a recommendation or endorsement.

Glossary of terms

Aneurysm = weak spot on an artery.

Angiogram = a medical procedure to locate a burst blood vessel.

Anticoagulant = a type of blood-thinning medication.

CAA = cerebral amyloid angiopathy (build up of the protein angiopathy in the blood vessels to the brain).

Craniotomy = a type of brain surgery after a bleed in the brain to remove any blood, relieve pressure or to repair blood vessels.

CSF = cerebrospinal fluid (fluid that bathes the brain and spine).

CT = computerised tomography (a type of brain scan).

Haemorrhage = a bleed.

Hydrocephalus = build up of cerebrospinal fluid in or around the brain.

Intracerebral = within the brain.

Lumbar puncture = a procedure to remove a sample of cerebrospinal fluid.

MRI = magnetic resonance imaging (a type of brain scan).

Subarachnoid haemorrhage (SAH) = a type of stroke caused by bleeding on the surface of the brain.

Subarachnoid space = space between the brain and skull.

Vascular malformations = abnormal blood vessels.

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For sources used, visit stroke.org.uk

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