

Ruptured berry aneurysm and subarachnoid haemorrhage

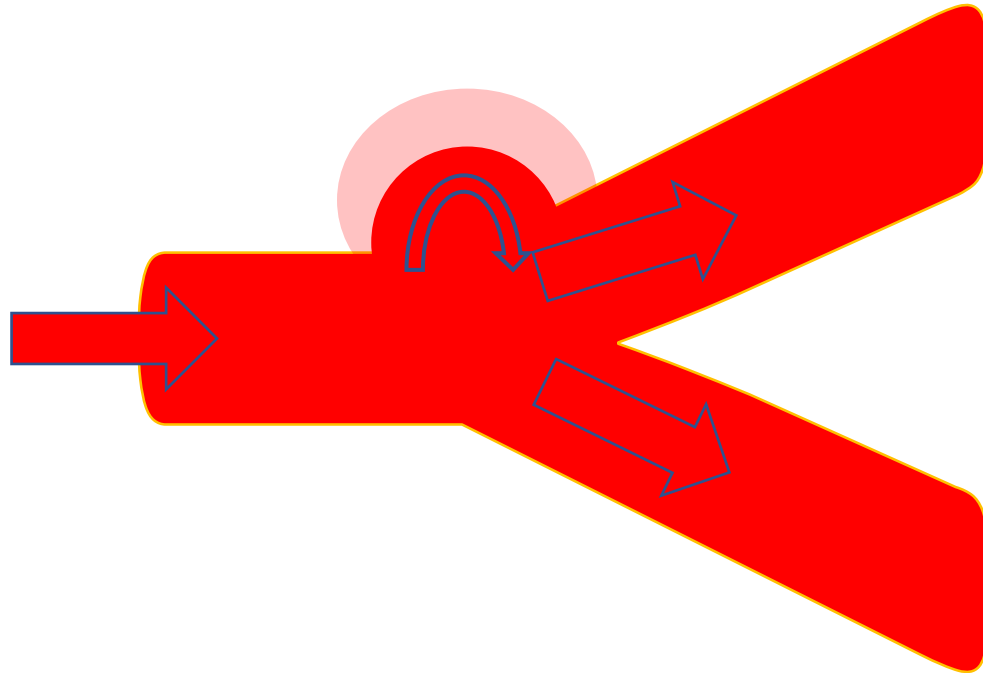
Information for relatives of patients on the critical
care unit at Salford Royal Hospital.

Introduction

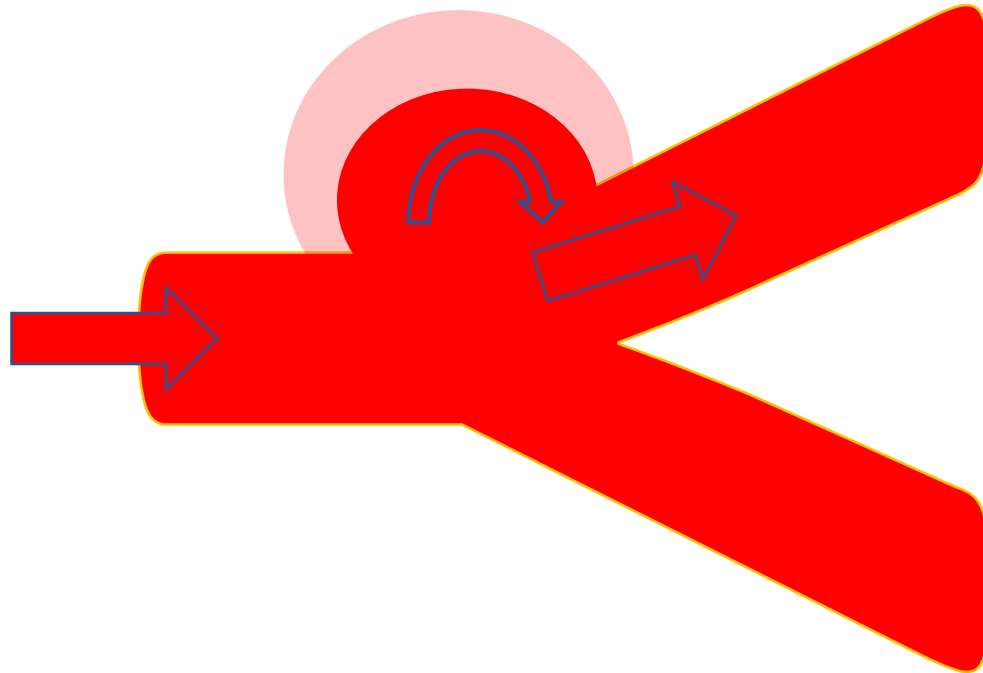
- Having a relative suffer from a subarachnoid haemorrhage who is admitted to the critical care unit is one of the most distressing things that can happen to you.
- The nature of the disease is that the bleeding happens suddenly so you have no chance to prepare. The sudden change seems very unreal to most people.
- Subarachnoid haemorrhage is also complicated and lots of things may or may not happen.
- The aim of the presentation is to provide you with some information about the disease to help you cope.
- The presentation can also be shared with other relatives so you don't have to explain all of this to them.
- There are a total of 37 slides, you can watch them all at once or in parts.
- Whatever happens you can be assured that there are lots of people looking after your relative 24 hours a day and that the staff at Salford Royal have lots of experience looking after patients who have had a subarachnoid haemorrhage.

What is a berry aneurysm?

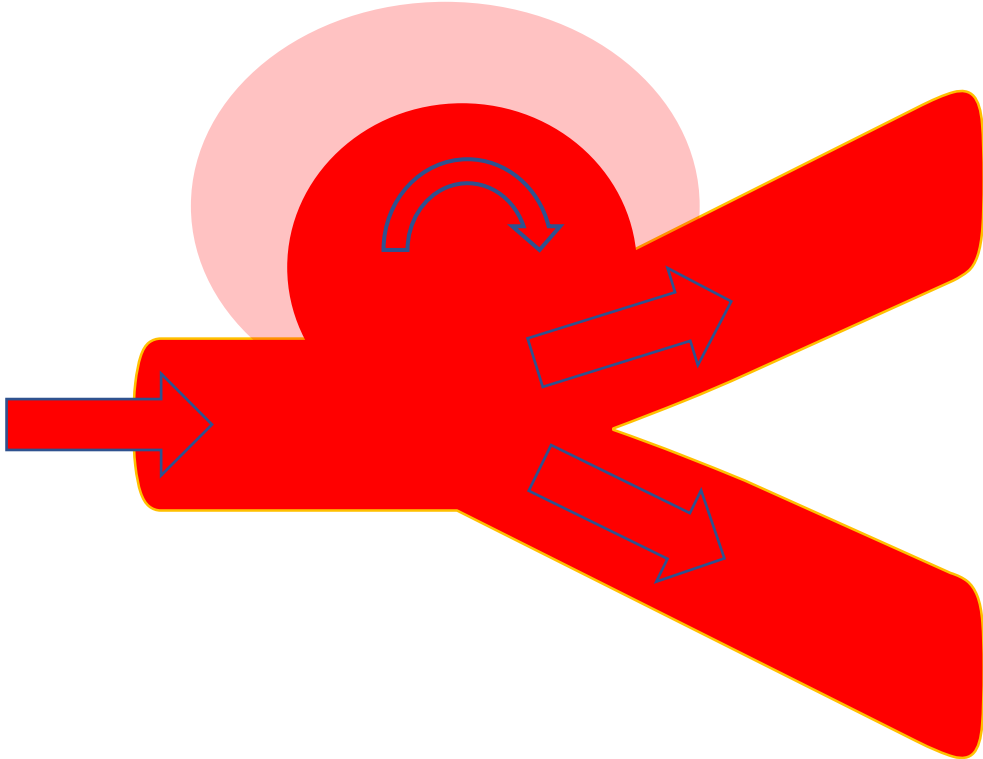
Arteries are blood vessels that supply blood around the body. Some people have a slight weakness in the wall an artery that supplies blood to their brain. These weaknesses are often found where arteries divide. The weakness causes a round outpouching of the artery known as an aneurysm. It's called a berry aneurysm because it looks like a small berry on the side of the artery.



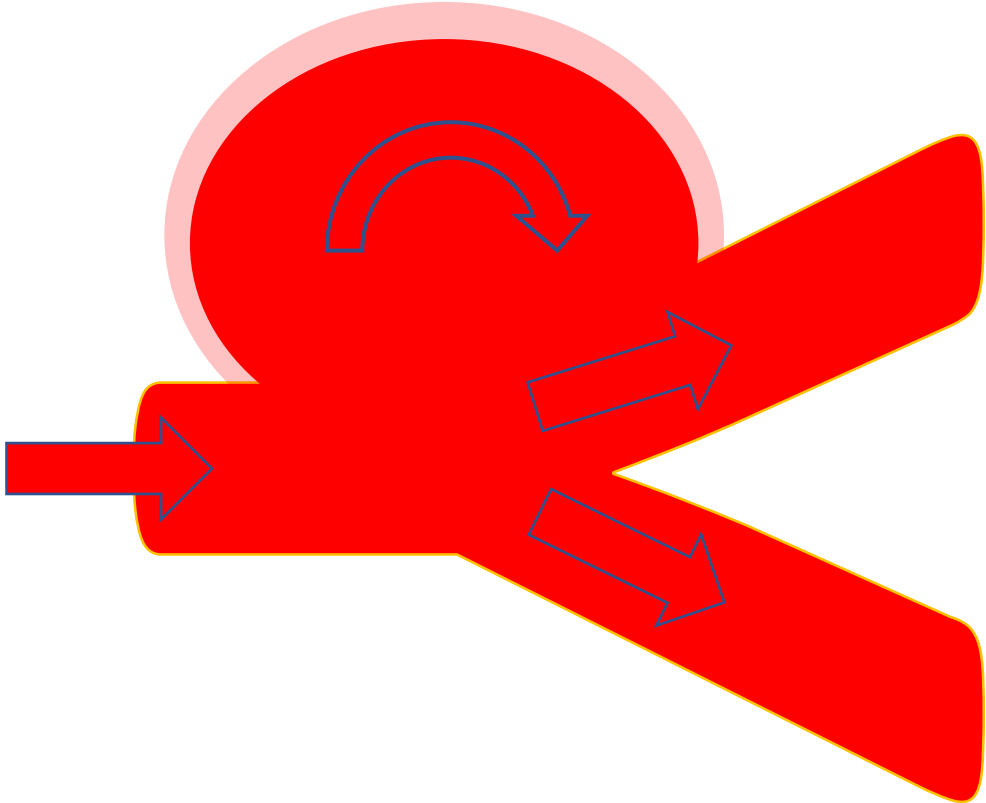
In most people the aneurysm does not cause any symptoms and you wouldn't know that you had one. Unfortunately, in some people the aneurysm can stretch and get bigger, like blowing up a balloon. This can happen over a long time and again it normally doesn't cause any symptoms.



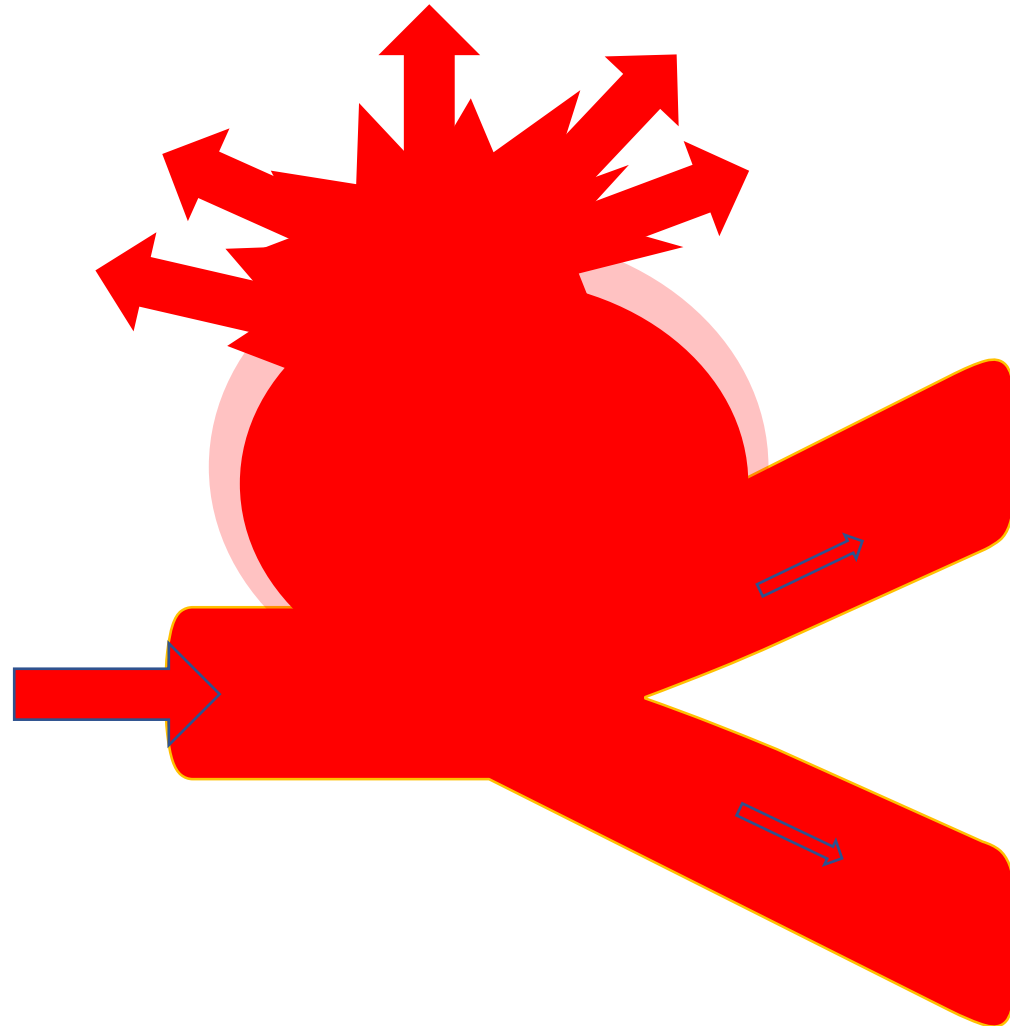
When the aneurysm grows the wall of the artery stretches and gets weaker.



This process can continue until-



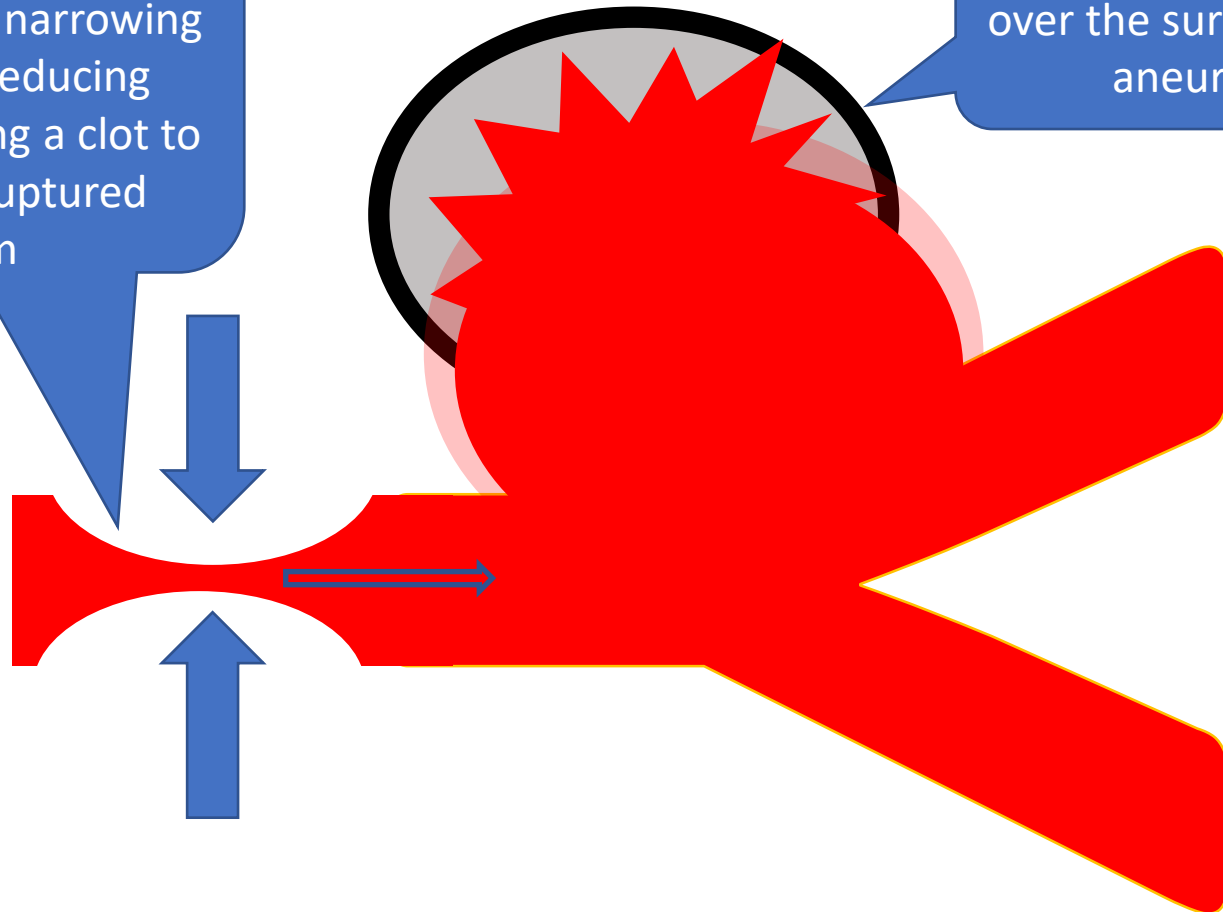
The aneurysm bursts or ruptures. Suddenly everything changes, from having an aneurysm that you don't even know that you have to having a ruptured aneurysm. This is an absolutely life threatening condition from which many patients can die.



Many people die within a short time of the aneurysm rupturing. Fortunately in other people the aneurysm stops bleeding so we have an opportunity to help them. The bleeding stops mainly because a blood clot forms over the surface of the aneurysm and because the artery constricts to decrease the flow of blood into the aneurysm.

The artery senses the blood loss and muscles in the artery constrict so narrowing the artery and reducing blood flow, allowing a clot to form over the ruptured aneurysm

A blood clot forms over the surface of the aneurysm



How common is subarachnoid haemorrhage from a ruptured berry aneurysm?



**2.7 Million people live
in Greater Manchester**

We are the neuroscience centre for Greater Manchester and we accept patients mostly from the 2.7 Million people who live in Greater Manchester.

In the five years from 2017 to 2021 we admitted 867 patients with a subarachnoid haemorrhage caused by an aneurysm to our critical care unit.

Other patients will have died before they can get to us and a few patients won't have needed to come to critical care.

Of the patients admitted with a subarachnoid haemorrhage- 573 of 867 (66%) were female, most were between 40 and 70 years old.

734 of 867 (85%) were discharged from hospital alive, a few are still in hospital but most of the others died of complications of the haemorrhage during their hospital stay.

We can see from this that subarachnoid haemorrhage is rare, but because all of the patients from Greater Manchester come to Salford we have a lot of experience in treating patients.

Why has this happened to my relative?

- **Most times we don't know why some people have a subarachnoid haemorrhage from an aneurysm.**
- **They are more common as we get older, they are more common in females and more common if you smoke or have high blood pressure.**
- **Sometimes they are more common in some families and we will ask if anyone else in the family has had a similar condition.**
- **Having said all of this, it is possible for any adult and even for a child to have a subarachnoid haemorrhage.**

Is there anything that I could have done?

- We don't really know why people develop a ruptured aneurysm and the aneurysm doesn't normally cause symptoms before it ruptures
- This means that **there is nothing that you could have done to prevent the haemorrhage**
- The patient will have been doing something before the haemorrhage- Exercising, getting out of the bath, using the toilet, making love, getting out of bed.
- This does not mean that it was that activity triggered the haemorrhage. In any case, if the aneurysm hadn't ruptured when it did it would have ruptured at some other time shortly afterwards.

Why is the condition called a “Subarachnoid haemorrhage”

- The brain has several linings, the “arachnoid” is the lining just above the surface of the brain.
- Because the berry aneurysm is below the arachnoid the bleeding will also be below the arachnoid- and this is why we describe the haemorrhage as a “Subarachnoid haemorrhage”.
- “Subarachnoid haemorrhage” is one type of what is also commonly described as a “brain haemorrhage” or a “bleed on the brain”.
- Brain haemorrhages are a type of stroke.

Why has my relative come to the critical care unit?

- Some patients who have had a subarachnoid haemorrhage don't look that ill BUT-
- Patients who have had a subarachnoid haemorrhage need lots of observations to look for potential complications.
- This can only be done in a critical care unit where there are lots of nurses who have been trained on how to make these observations.
- Critical care units also have lots of doctors who can respond appropriately to these observations.
- Some patients are obviously very ill and are unconscious and connected to a breathing machine (a ventilator). This can only be done on a critical care unit.

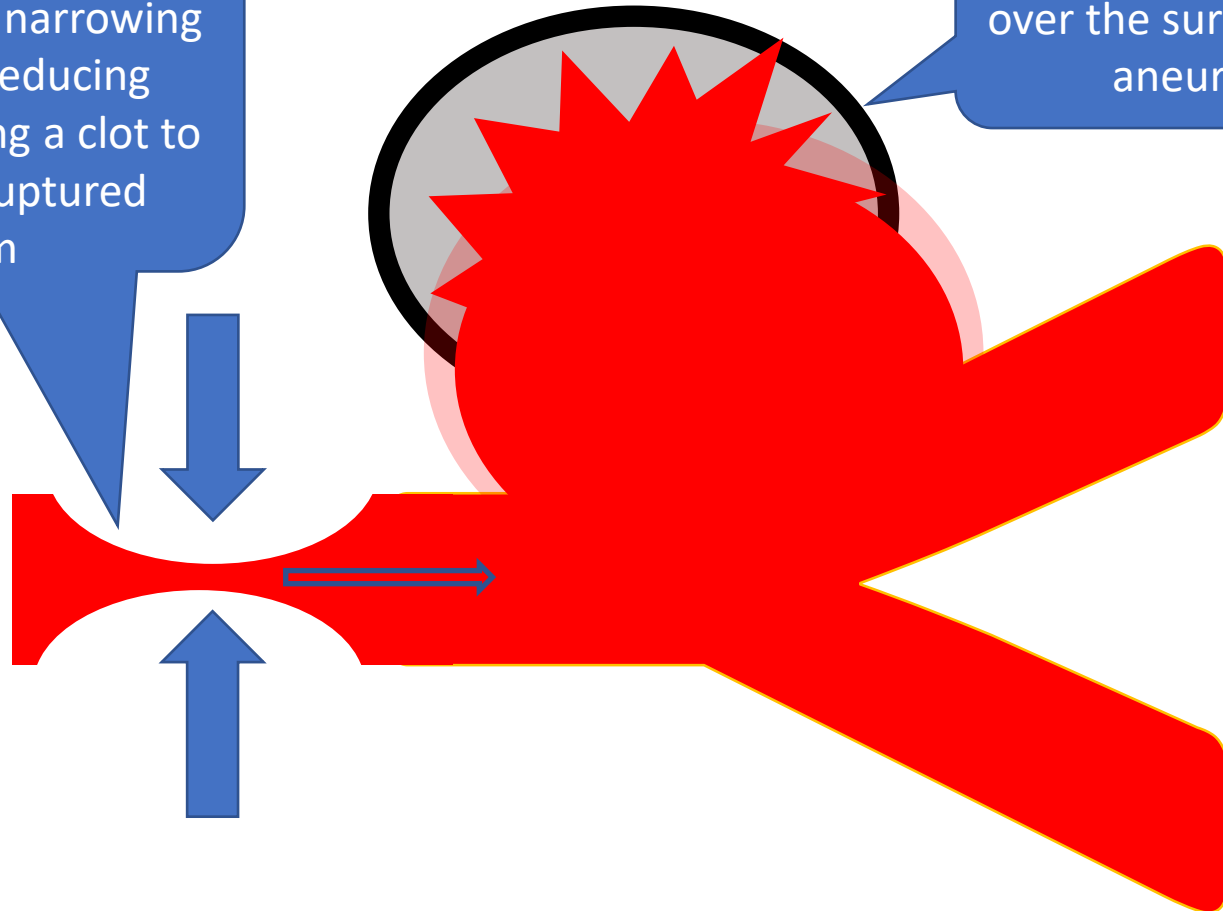
Why is my relative on a ventilator?

- Some patients need to be sedated and connected to a ventilator. A ventilator is a machine that takes over the work of breathing from a patient. The patient is often connected to the ventilator by a tube that comes out of their mouth.
- The most common reason why this is done is because the patient is unconscious because of bleeding from the aneurysm. This may be because of the blood clot pressing on the brain, or a reduction in blood flow to the brain, or because the bleeding has triggered a type of fit. These problems may improve over time.
- Less commonly, the bleeding will cause the brain to release chemicals that may weaken the heart so that fluid can collect in the lungs to make breathing very difficult without help. Breathing can also be effected if the patient vomits at the time of the bleeding. Both of these problems normally improve over time.

The arterial spasm and the blood clot allow the bleeding to stop, but the blood clot will dissolve and the spasm will relax over a number of days. **This means that we normally have to do something to stop the artery bleeding again.**

The artery senses the blood loss and muscles in the artery constrict so narrowing the artery and reducing blood flow, allowing a clot to form over the ruptured aneurysm

A blood clot forms over the surface of the aneurysm



How do we stop the aneurysm bleeding again?

- Most commonly we carry out a procedure called “Coiling” where fine coils of wire are put inside the aneurysm to block it off.
- Sometimes this can’t be done and the patient needs an operation known as “Clipping” to put a metal clip over the outside of the aneurysm.
- These procedures will be explained in the next few slides.

What is coiling?

- Endovascular coiling (coiling) is a procedure where small metal coils are packed into an aneurysm to stop blood from entering it and bleeding. Coiling doesn't involve open brain surgery and where appropriate is the treatment of choice. Not all aneurysms can be coiled due to size and location.

How is coiling carried out?

- Under general anaesthetic, a small tube (catheter) is inserted into a blood vessel in the patient's groin.
- The tube is guided through major blood vessels to the brain using X-ray imaging. Once the tube reaches the aneurysm, small metal coils are used to seal the aneurysm off from connecting blood vessels.
- The procedure is carried out by specialist doctors known as interventional radiologists in specialist centres like Salford Royal.

Things can go wrong

- Entering blood vessels in the brain has risks, and sometimes complications can happen that affect recovery and long term health.

Possible complications include:

- Stroke-like symptoms including weakness or numbness and problems with vision or speech.
- Damage to the artery where the catheter is inserted.
- Aneurysm recurrence at a later point.

What is clipping?

- A small number of people are treated with surgical clipping, clipping is done when coiling isn't possible. Surgical clipping is an open operation carried out by a brain surgeon to prevent the aneurysm from bleeding again.

How does clipping work?

- Under general anaesthetic, a part of the patient's skull is opened, the surgeon will then place a metal clip across the neck of the aneurysm. The clip seals off the aneurysm from the connecting blood vessel and prevents further bleeding. Unfortunately, patients who have a clipping procedure take longer to recover and are more likely to have complications than patients who have a coiling procedure.

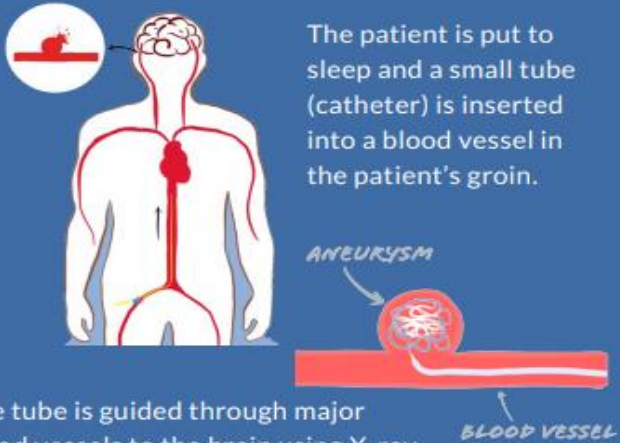
What is coiling?

Endovascular coiling (coiling) is a procedure where small metal coils are packed into an aneurysm to stop blood from entering it and bleeding. Coiling doesn't involve open brain surgery and is safer in patients with significant health problems. Not all aneurysms can be coiled due to size and location.



8 out of 10 of patients are treated with coiling.

How is coiling carried out?



The patient is put to sleep and a small tube (catheter) is inserted into a blood vessel in the patient's groin.

The tube is guided through major blood vessels to the brain using X-ray imaging. Once the tube reaches the aneurysm, small metal coils are used to seal the aneurysm off from connecting blood vessels.

The procedure is carried out by specialist doctors known as interventional radiologists in specialist treatment centres.



Complications and risk

Entering blood vessels in the brain isn't without risk, there are potential complications that can affect recovery and long-term health.



Complications occur in approximately 1 in 10 patients.

Possible complications include:

- Stroke-like symptoms including weakness or numbness and problems with vision or speech.
- Aneurysm recurrence and re-bleeding
- Infection
- Damage to the artery where the catheter is inserted.



One in ten patients require another coiling procedure at a later point.

What is clipping?

A small number of people are treated with surgical clipping, clipping is done when coiling isn't possible. Surgical clipping is an open operation carried out by a brain surgeon (neurosurgeon) to stop the bleeding.



How does clipping work?

The patient is put to sleep and a part of the skull is opened, the surgeon will then place a metal clip across the neck of the aneurysm. The clip seals off the aneurysm from the connecting blood vessel and prevents any further bleeding. Clipping procedures have a longer recovery time and have a higher post-procedure complication rate compared to coiling.



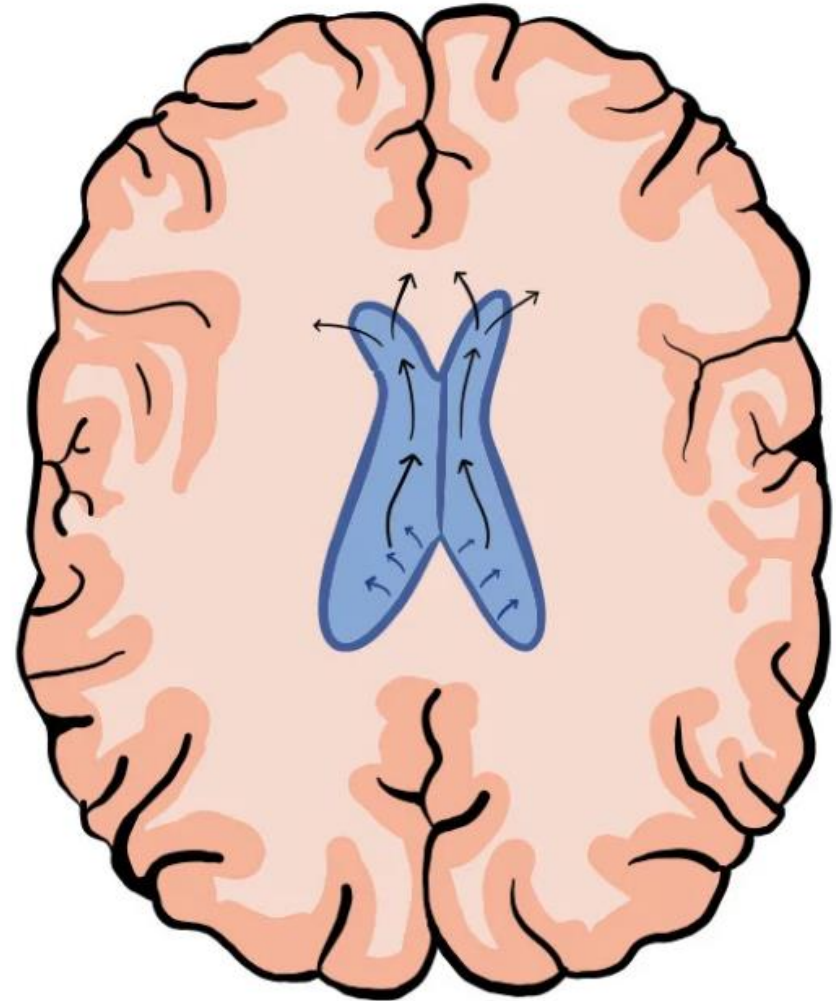
Clipped Aneurysm

What things can go wrong after a Subarachnoid haemorrhage?

- There are lots of things that can go wrong after a patient is admitted to the critical care unit with a subarachnoid haemorrhage. Sometimes rare things happen that we can't predict.
- Two of the most important complications are:
 - A build up of fluid around the brain known as “hydrocephalus”.
 - Spasm or abnormal contraction of the arteries going to the brain. This is a condition known as “Vasospasm”.
- We will talk about these in the next couple of slides. We will start with hydrocephalus as it most common in the first two days after a subarachnoid.
- Vasospasm tends to happen later, normally after a few days.

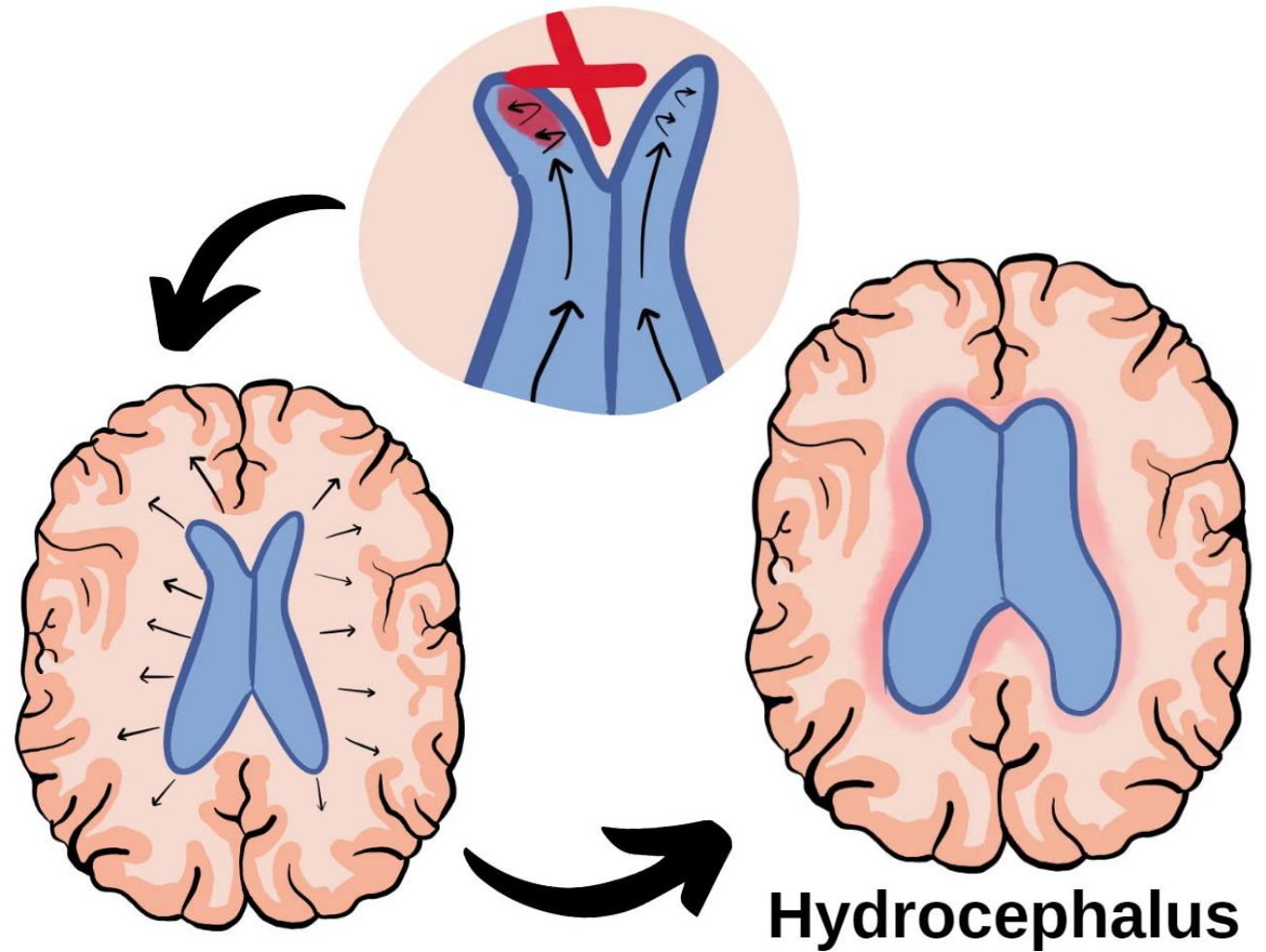
Hydrocephalus

- There are fluid filled spaces in the brain called ventricles. The lining of the ventricles make this fluid to surround and protect the brain. It flows around the brain and then drains away.



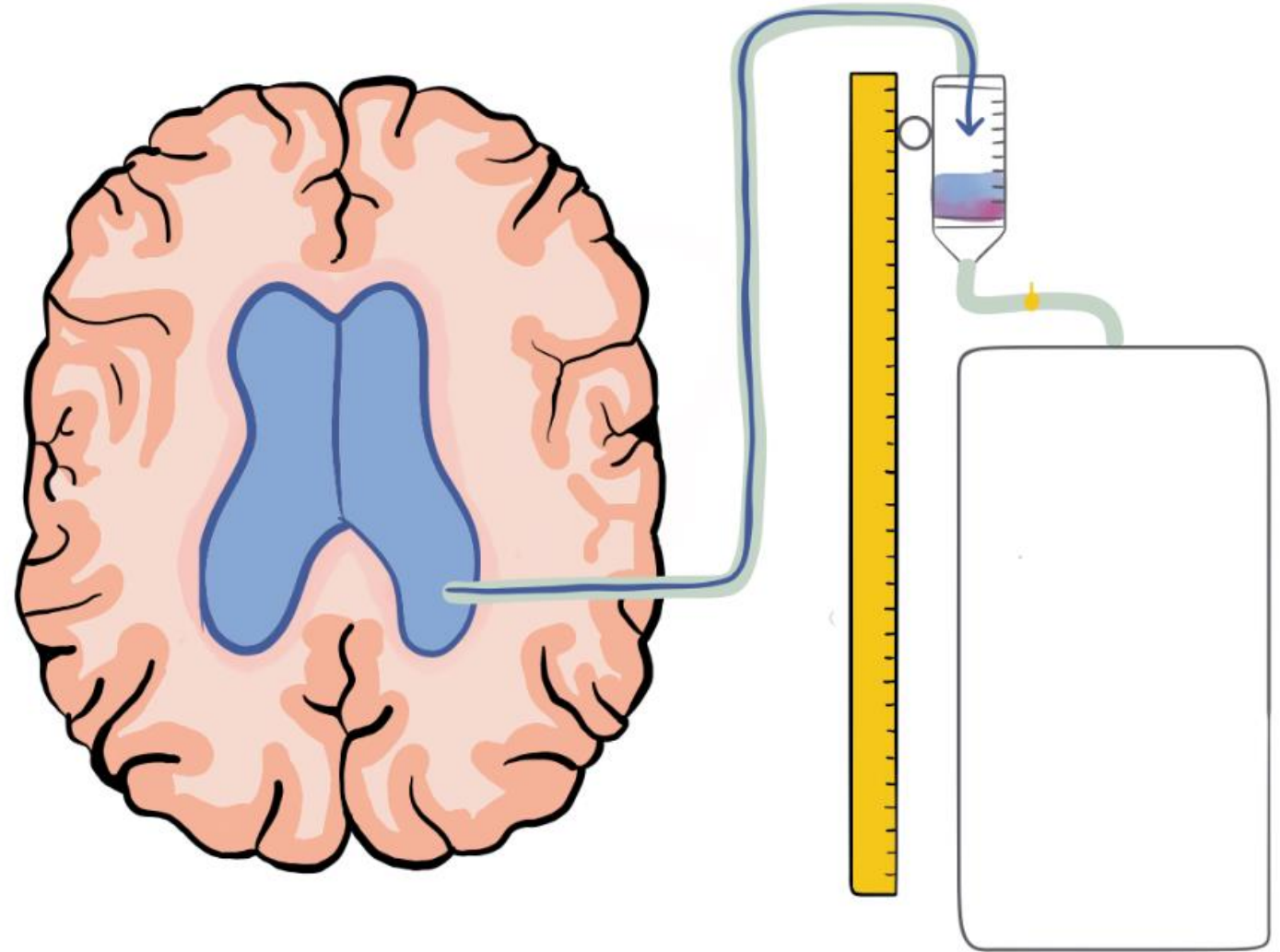
Healthy Brain

- Sometimes after a Subarachnoid Haemorrhage, the bleeding can block the drainage route. The fluid then builds up and puts pressure on the brain. This is called **hydrocephalus**. It can make people very unwell.



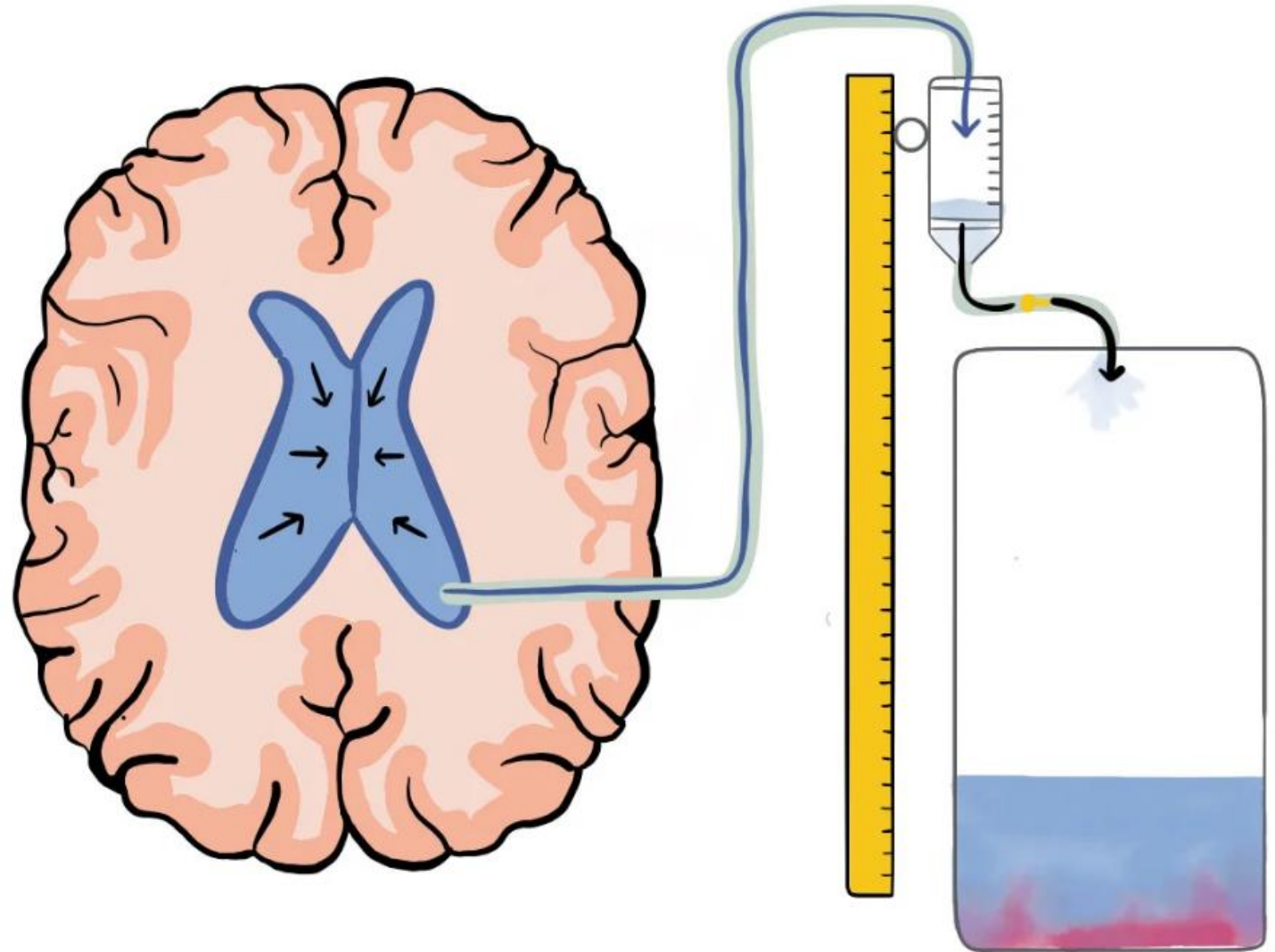
What can we do to help?

- We can reduce the pressure in the brain by placing a drain into the fluid space to remove some of the excess fluid. This is called an External Ventricular Drain (EVD) and is put in by a brain surgeon (neurosurgeon).



How does it work?

- The drain allows some fluid to leave the brain so that it is under less pressure. Sometimes this fluid will be blood stained. The doctors and nurses will carefully control and monitor the amount of fluid being drained. They may also use a special device to monitor the pressure inside the head.



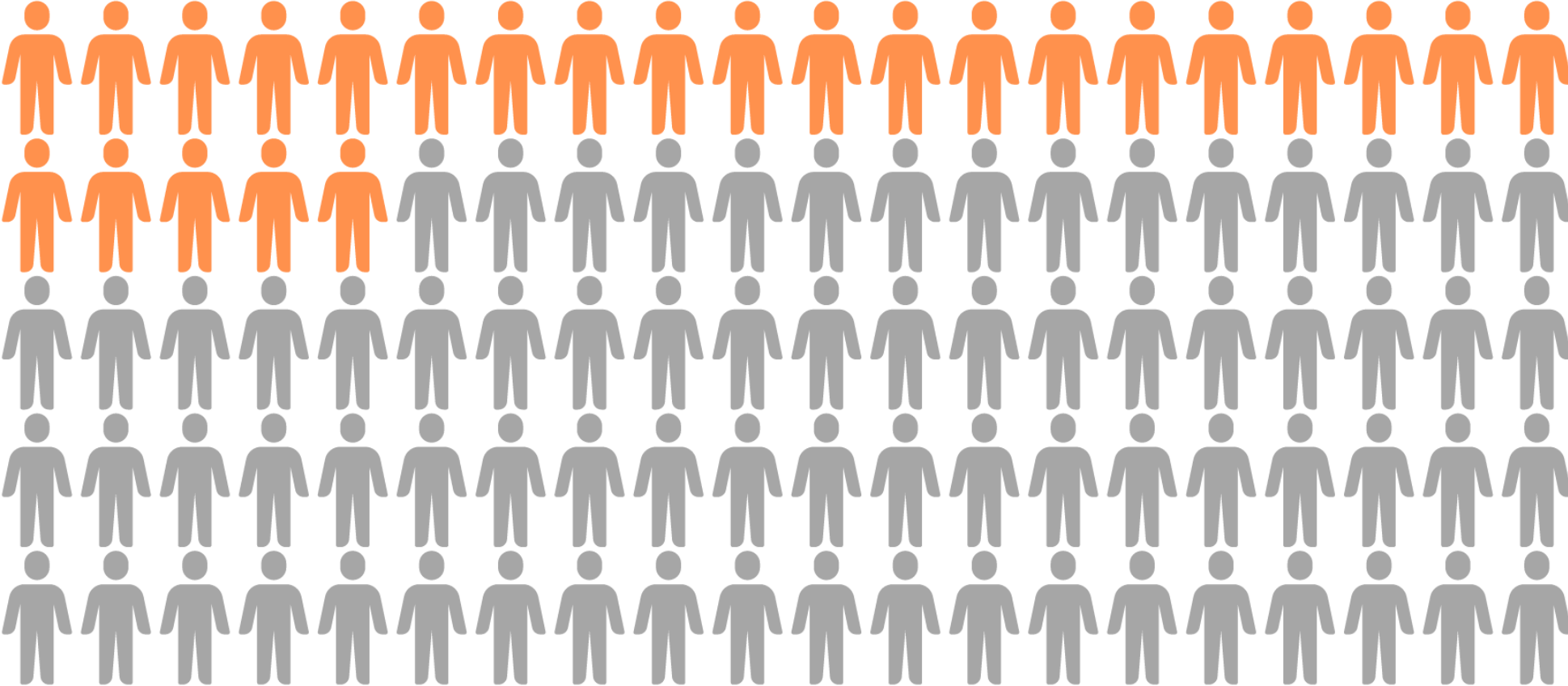
How do we look after an EVD?

- The tube that goes into the head has a special coating which makes it difficult for germs to grow. This reduces the risk of infection.
- The EVD is looked after very carefully by highly trained staff. It is kept very clean and is never touched without wearing an apron and clean gloves. This reduces the risk of infection.
- Nurses will check that the drain does not become blocked and that it is working properly. If a blockage is found, we can try to clear it. If we cannot unblock the drain, we may need to replace it.
- The nurse will measure how much fluid is coming out of the drain several times a day. They will also observe the patient's conscious level and limb movements. The doctors will change the settings of the drain if needed

How long will the drain be needed?

- Everybody is different and we will keep the drain for as long as it's needed. This is normally around a week to 10 days.
- Once the body's own drainage system is working again it should not be needed anymore. The doctors and nurses will slowly change the settings on the drain, and then will clamp it off to make sure that the patient remains well before it is removed.

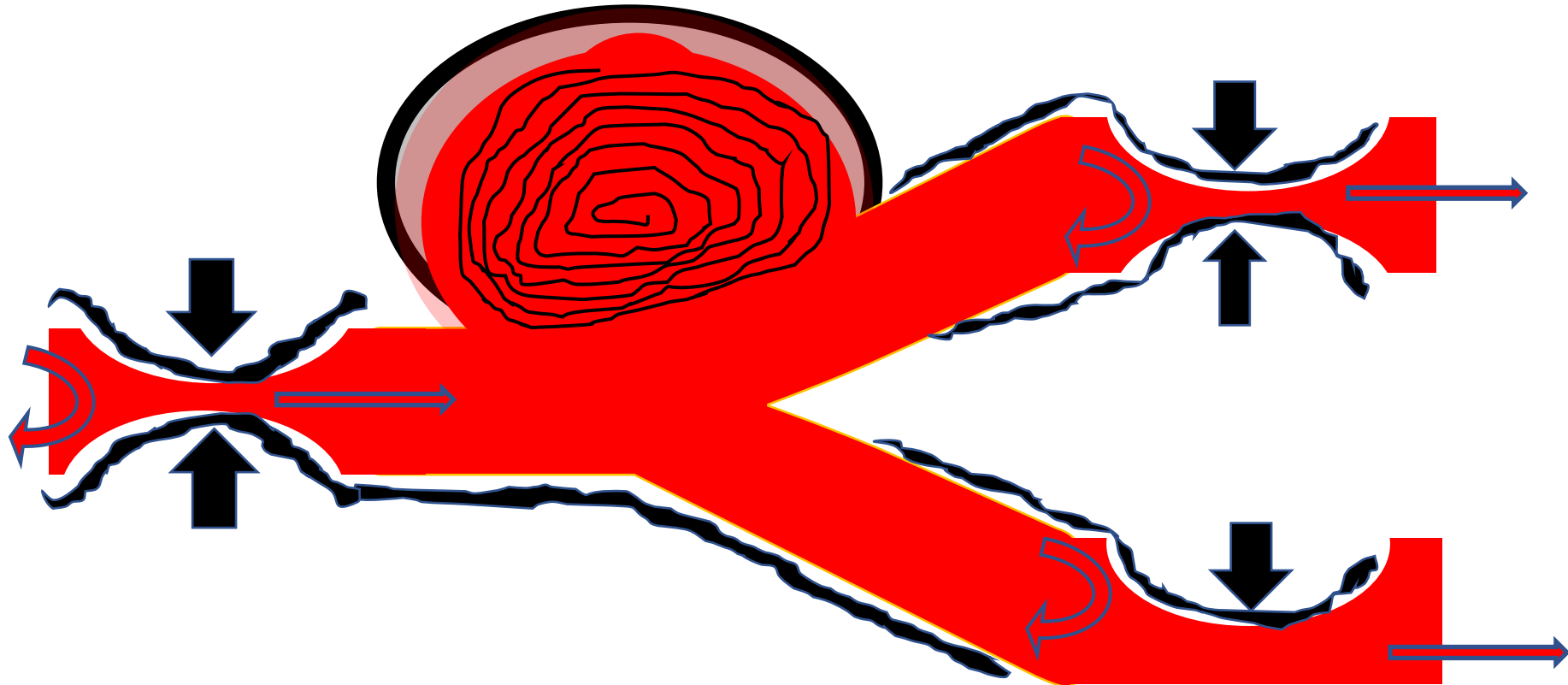
Around 200 people are admitted to Salford Royal Hospital with a Subarachnoid Haemorrhage each year.



Of these, about 1 out of every 4 patients will need an EVD.

Vasospasm

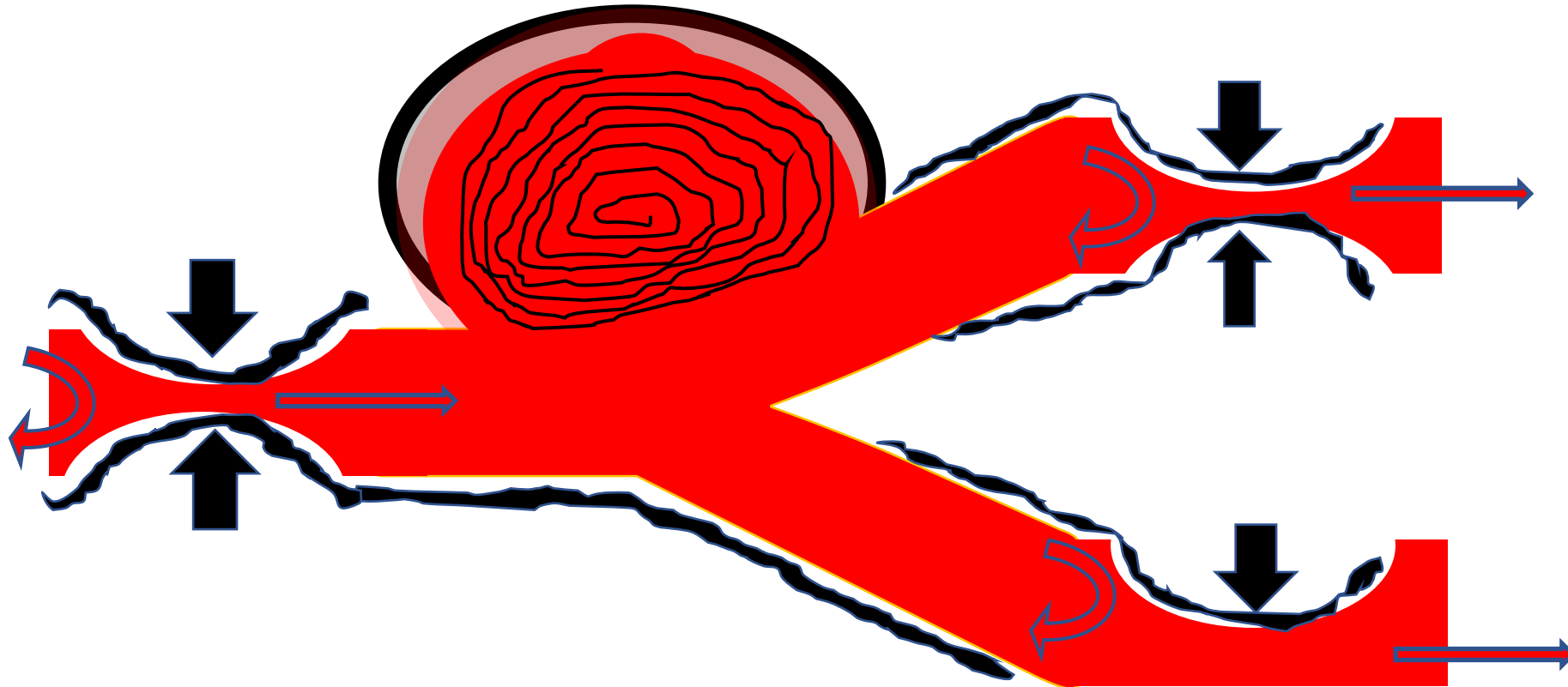
After a subarachnoid haemorrhage there is blood clot over the surface of many arteries that supply the brain with blood. Unfortunately this may trigger muscles in the artery to constrict, causing the artery to narrow significantly. This process is known as “spasm” or “vasospasm”. Vasospasm was important in getting the aneurysm to stop bleeding when it first ruptured. Unfortunately, after the aneurysm is protected “vasospasm” is a very major problem. This is because it may effect lots of arteries and may very significantly block the flow of blood to important parts of the brain.



Vasospasm 2.

Vasospasm normally happens a few days after the initial bleed, but it is a potential risk for up to 3 weeks after the bleed. Almost all patients are given a drug called “Nimodipine” which reduces the chance of vasospasm, but it can still happen. The larger the initial bleed the more likely you are to get vasospasm, but it can happen even after a small bleed.

If 10 patients have a subarachnoid haemorrhage it's likely 3 of them will get vasospasm.



Preventing and identifying vasospasm

- **As well as giving patients nimodipine, we also given then a lot of fluid into their drip to keep them well hydrated. We also tend to keep patients in bed much longer if they have had a subarachnoid.**
- **The earliest signs of vasospasm are due to a lack of blood flow to the brain and are shown in the diagram.**
- We spend a lot of time looking for signs of vasospasm in patients who have had a subarachnoid haemorrhage, how we do this is shown in the next couple of slides.

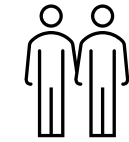
Looking for vasospasm

- **To identify vasospasm we make lots of assessments of the patient's consciousness and how well they can move.**
- **We describe this as “assessing the patients neurology” or measuring their “Glasgow Coma Score”.**
- **The assessments are done every hour or so by the doctors and nurses.**
- **Frequently the patient will have to be woken at night to make these measurements.**
- **We also look for other signs that are shown on the next slide. If you notice these in your relative then please tell the staff.**

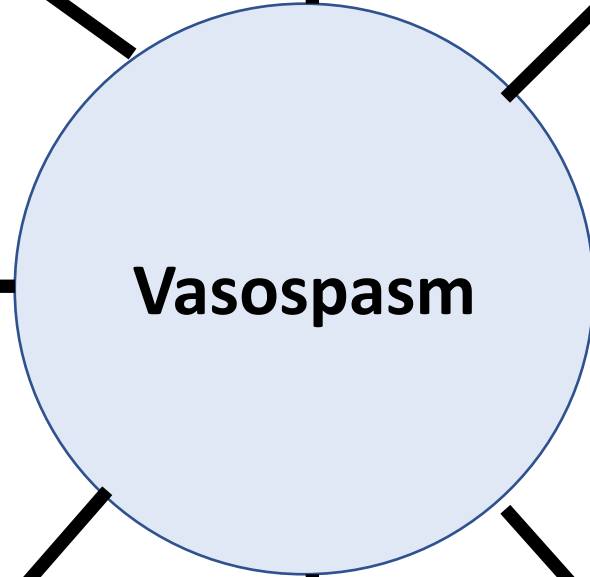
Signs of vasospasm-
If you notice your relative having any of these, please tell the nurse.



Mood change or agitation



Seeing double



Vasospasm

More sleepy



Numbness or weakness of the face arm or leg on one side of the body



Confusion



Dizziness



Difficulty speaking



Worse headache



Treatments

- **If we identify changes that may be caused by vasospasm we normally get a special type of CT scan known as a “CT angiogram”.**
- **This will help us decide if the patient has vasospasm or some other problem.**
- **The most common treatments are to increase the patient’s blood pressure with drugs and give lots of fluids. These interventions are to try and force blood through the narrowing.**
- **Occasionally the patient may be suitable for a special X-ray procedure to dilate the arteries.**
- **Unfortunately these treatments don’t always work and patients may go on to have a stroke due to a part of the brain being starved of oxygen.**
- **In other patients the blood vessels will eventually relax after a few days and they will start to improve again.**

What's going to happen to my relative?

- There are somethings that make a patient with subarachnoid less likely to survive.
- These include if they are unconscious, if they are old and if they have complications like hydrocephalus or vasospasm.
- Sometimes people with none of this problems can die while other patients who seem very ill actually recover well.
- Predicting who is going to be left with a long term disability is difficult and this will be discussed with you by the staff looking after your relative.
- For every 10 patients admitted to the critical care unit we would expect around 8 to go home. For 10 patients who survive, 7 stay in the critical care unit for between 3 and 7 days, with a hospital stay of between 14 and 28 days.
- What ever happens, your relative is in a neurosciences centre where the staff are experts in managing subarachnoid haemorrhage. There are nurses and doctors looking after your relative 24 hours a day. They are supported by neurosurgeons and interventional radiologists with an international reputation for looking after patients with this condition.
- Further general information about our critical care unit and the staff who work there can be found at Salfordcriticalcare.org. The site also has information and links to other sites that can support you.