This fact sheet provides information on the coiling of brain aneurysms. Our fact sheets are designed as general introductions to each subject and are intended to be concise. Each person is affected differently and you should speak with your doctor or specialist for individual advice.

**What is a brain aneurysm?**
A brain aneurysm is a balloon-like swelling that results from a weakness in the wall of one of the blood vessels supplying blood to the brain. There is a risk that the aneurysm will rupture (burst suddenly) and cause a haemorrhage (bleed).

**What is coiling?**
In the 1990s, coiling was introduced as a way of treating ruptured and unruptured aneurysms without the need for a craniotomy (an operation to open the head to expose the brain). Coiling involves approaching the aneurysm from inside the blood vessel, avoiding the need to open the skull. Small metal coils are inserted into the aneurysm through the arteries that run from the groin to the brain. The coils remain in the aneurysm: they are not removed. They prevent blood flowing into the aneurysm and therefore reduce the risk of a bleed or a re-bleed. Blood then clots around the coils sealing off the weakened area.

**What happens before the procedure?**
The coiling procedure is similar to an angiogram (an X-ray test to take pictures of the blood vessels) and involves a very small tube (catheter) being fed up to the brain via blood vessels from the groin. However, it is much more complex and is usually carried out under a general anaesthetic in the radiology department.

This means you must not eat or drink anything for four to six hours before the procedure. The staff on the ward will advise you on this.

Before you leave the ward, a nurse might shave a small area of your groin at the entry site through which the coils will be passed. If you are well enough, and if you prefer, you might be able to shave yourself.

On arrival at the radiology department, an anaesthetist will give you a general anaesthetic and you will be asleep throughout the procedure.

**What happens during the procedure?**
The room will have several large pieces of high-technology scanning equipment which are needed to perform the coiling.

The radiologist will make a small incision in your groin through which they will insert the catheter into your femoral artery. This is then guided through other blood vessels in your body until it reaches your neck and then into your brain.
Using a guide wire, one by one, the coils are slowly inserted into the aneurysm. The coils are made of platinum, are twice the width of a human hair, and can vary in length. The number of coils needed depends on the size of the aneurysm. The largest coil is inserted first and then smaller coils are inserted until the aneurysm is filled. Usually, several coils will be used.

Each coil has a small electric current passed through it to detach it from the guide wire. This small current also helps the blood to clot and helps to seal the aneurysm.

The radiologist will remove the catheter. Occasionally, the entry point in the groin will need to be sealed or stitched. It might be slightly painful and there might be some bruising.

Coiling is a complex and delicate procedure that will take at least three hours and often longer.

An aneurysm being packed with platinum coils through the blood vessel

What happens after the procedure?
You will probably spend some time in the high dependency unit – usually at least two hours.

During this time, regular neurological observations will be performed by the nursing staff. This is to check that you are waking up properly from the anaesthetic. It involves asking you simple questions, testing the strength of your arms and legs, and shining a light in your eyes. Your blood pressure, heart rate, respiratory rate, and oxygen levels will also be monitored.

The nurse will check the small wound in your groin for any bleeding and also check the pulse in your foot. This is to ensure that your blood circulation to your legs has not been affected.

It might be that the opening in your artery in your groin is plugged closed after the procedure. This is done with a device called an angioseal.

You will have to lie flat, or at an angle of no more than 30 degrees, for at least six hours following the procedure. This helps with your blood pressure and prevents any excess pressure on the artery which could increase the chance of bleeding at the puncture site in your groin. Depending on your recovery after this time, you will be able to sit up gradually. The nurses will assist you with this.

Throughout this time, the nurses on the ward will continue to monitor you and carry out neurological observations. Pain-killers will be given for any discomfort or headaches you might be experiencing. You are also likely to have a drip to prevent dehydration, and possibly a urinary catheter. Because you are restricted to bed rest, you will have to wear pressure stockings to help prevent blood clots forming in your legs (deep vein thrombosis).

What are the risks of coiling?
It is likely that the benefits of coiling will strongly outweigh any possible risks, and your doctor will have discussed this with you fully before you give your consent to go ahead with the procedure.

However, as with any invasive procedure, there are certain risks associated with coiling. Possible complications include stroke-like symptoms such as weakness or numbness in an arm or leg, problems with speech, or problems with vision.

There is also a risk of bleeding, infection or arterial damage at the entry site in the groin.
How successful is coiling?
Research is still being conducted to explore the benefits and risks of coiling. Various studies have been published. The largest is the International Subarachnoid Aneurysm Trial (ISAT) which was established to explore the effectiveness of coiling compared to the clipping of ruptured aneurysms during a craniotomy. The trial involved different neurosurgical centres and a total of 2,143 patients participated. The ISAT trial showed that the long-term risks of further bleeding are low for both coiling and clipping, and the results positively supported coiling as a treatment for ruptured aneurysms, both in terms of survival and in the reduction of long-term disability.

The National Institute for Health and Clinical Excellence (NICE) have approved coiling as a treatment of ruptured aneurysms and have published guidelines on the procedure.

Can the coils move?
Once the coils are securely in place they will not move out of the aneurysm.

Will I need more coils?
Although the coils do not move, they might settle into the space within the aneurysm. This might mean that more coils are required to block off the aneurysm fully. This is why you will have a follow-up angiogram. Around one in five patients will require further treatment.