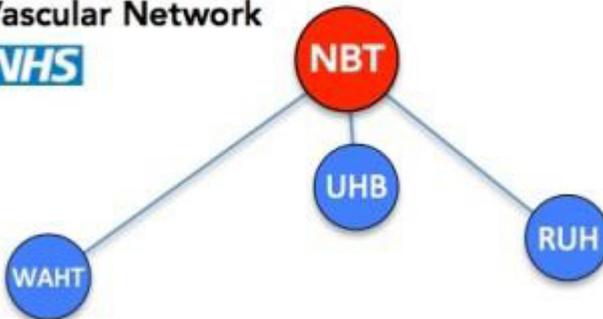


Stent Grafting for treating Abdominal Aortic Aneurysms (EVAR)

Bristol Bath Weston
Vascular Network



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Ask 3 Questions

Preparation for your Appointments

We want you to be active in your healthcare. By telling us what is important to you and asking questions you can help with this. The three questions below may be useful:



STENT GRAFTING (ENDOVASCULAR REPAIR) FOR ABDOMINAL AORTIC ANEURYSMS (AAA)

What does stent grafting involve?



A stent graft consists of synthetic fabric tubes (the graft) mounted onto metal skeletons (stents). It comes pre-loaded in a slim line delivery system, which is used to position the stent-graft in the aorta. The delivery system is small enough to be inserted through an artery in the groin, and we use X-rays to guide the graft into place.

The stent graft is then precisely opened up inside the aorta. The aim of stent grafting is to allow blood to only flow through the stent graft tubes and not into the bulging sac of the aneurysm. In this way we “exclude” the aneurysm and prevent it from rupturing. Over time the aneurysm may shrink back down around the stents.

This is now the most common way to repair abdominal aortic aneurysms worldwide. In the UK over two thirds of planned AAA repairs are done using standard stents.

The procedure

Anaesthetic

The operation is typically performed either under general or spinal anaesthetic (injection in the back to numb the legs). Some specialists prefer to perform the operation with you awake under local anaesthetic. This involves injecting the groin area with anaesthetic to “freeze” the area.

Your specialist will discuss the pros and cons of each approach with you.

Groin Incisions

To put the stent into the aorta to treat your AAA we must first gain access to the blood vessels (arteries). To do this we usually use the arteries in the groins (femoral artery).

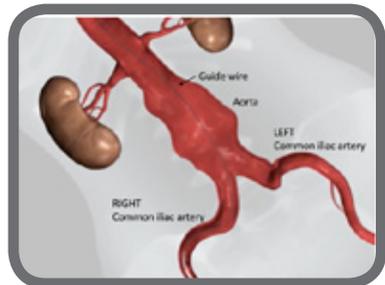
This can be done in two ways. The first method is by making small surgical incisions over the artery; this allows the team to see the artery and stitch it up closed after the delivery system containing the stent has been removed. The alternative is to use what is called a “percutaneous” method. The team will make tiny incisions over the artery but not deepen the cut down it. Instead the artery is punctured under ultrasound guidance and special devices inserted into the artery wall around the delivery system which then allow the team to close up the hole created in the artery without surgical stitches.

Your specialist team will assess you and your arteries to see which is most appropriate method to use.

Stenting

All the stenting procedure is done with the help of x-rays. This allows the team to accurately position the stent in the ideal position to treat your AAA. To treat most AAA we use a combination of two or three different types of stent (a “main body” and two “legs” or “limbs”) to build up a repair inside the aorta and arteries below (common iliac arteries)

The first part of the procedure requires the team to place a stiff “guide wire” into the aorta from the groin artery into the aorta up in the chest. This supports the delivery system and the stent as it is taken



from the groin, through the arteries in the pelvis and up into position in the abdomen, just below the kidney arteries.

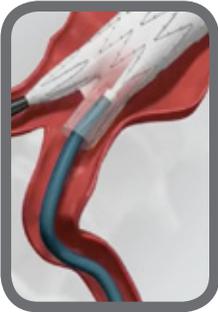


From the other groin the team will place a small tube (catheter) into the aorta. This catheter is used to perform an angiogram, where a dye is injected into your arteries whilst taking a x-ray. This is required to obtain a detailed map of your arteries because blood vessels do not show up on ordinary x-rays.

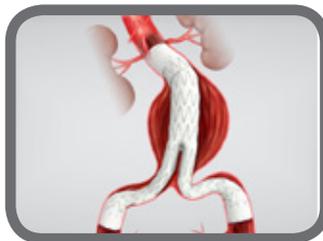
Once the team has a map of the arteries the first stent, usually the “main body” stent, can be opened up inside the aorta.



Using more catheters and guide wires, the “limb” stents are inserted on delivery systems and are then opened-up to seal the AAA above and below.



To complete the repair the joins between the stents are ballooned up and an angiogram is performed.



The final angiogram is done to check that the blood is now flowing through the stents and down the legs rather than around the stent and into the aneurysm. On the angiogram the team also check that there is blood flowing to the arteries supplying the kidneys and the pelvic organs/buttocks (internal iliac arteries). If the artery below the aorta (common iliac artery) is also large (aneurysmal) sometimes it is necessary to extend the stent further down towards the groin. This can mean closing off the artery to the pelvis/buttocks (internal iliac artery).

After the operation

After uncomplicated endovascular repair, most patients return to the hospital ward for one to three days.

You should be able to eat and drink normally once fully awake following your aneurysm repair. The nurses will aim to get you sitting up and walking as soon as possible. If you have a urinary catheter (tube into the bladder put in during surgery) we aim to remove this on the first night or morning after surgery.

Once you are up and about, you should be able to leave hospital, but may need painkilling tablets for up to a week. Discussions with patients who have undergone endovascular repair suggest that it can be normal to make a full recovery in about 2 weeks, however some people take longer and can tire and take several months to return to the health state they had prior to the operation. During this time, you should gradually build up your level of activity back to normal. You may resume normal sexual relations as soon as you as you feel comfortable.

Most people who are treated with endovascular repair can return to work within a month after having surgery.

Advantages of stent grafting

Stent grafting (EVAR) has a number of **advantages**, over traditional open surgery, which requires an abdominal incision and temporarily clamping off the main blood vessels going to the lower half of the body. In particular, with stenting there is a:

- Lower risk of death around the time of operation
 - In the UK the in hospital risk of death following stent grafting AAA is 0.4%* (1 patient every 250 AAA repairs)
- Lower risk of major complications as an in-patient after surgery
 - Just over 6% (1 in 17 patients) have a major complication*
 - Compared to open surgery there are
 - Less chest infections
 - Less heart attacks
 - Less kidney problems
- Rarely need high dependency or intensive care
- Less pain
- Quicker discharge from hospital (on average 2 days) and quicker return to normal activity (approximately 2 weeks)
- No risk of hernia or adhesions in the abdomen in the long term

*Data from the UK National Vascular Registry Report 2016

Problems after stent grafting

There are **disadvantages** to stents (EVAR) compared to open surgical repair:

- The incisions in the groin, even using the percutaneous method, may result in problems
 - Bleeding from or blockage of the artery in the groin
 - Burning pain in the thighs due to bruising of nerves
 - Wound infection, fluid discharge or lumps around the incision
- Stents can develop problems over time. **For this reason, you must have continued follow-up of the stent, with scans and x-rays required at least once a year to make sure that:**
 - the stents remain in the correct place (no “migration”), do not kink or break
 - blood is flowing through the stent and not around the stent and into the AAA (i.e. make sure the AAA is excluded). This type of problem is called an “endoleak” (see below)
 - the AAA is not starting to grow again (no “sac expansion”)
- Problems arise in up to **1 in 5 patients** in their lifetime. In the vast majority the problem can be fixed by doing further procedures under x-ray control, without needing a general anaesthetic.
- Stents can block unexpectedly causing one or both legs to lose the blood supply. **This may require emergency surgery.**
- Very rarely we may need to remove the stent and perform open surgery on your AAA (less than 1/100 stents); this can either be at the initial operation or sometime in the

future if the stent fails.

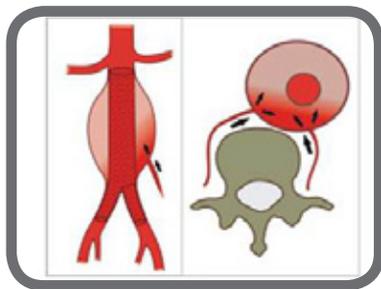
- Some studies have suggested that in the long term (> 8 years) that patient survival is lower after stent repair compared to open repair.

Endoleaks

At the end of the procedure or during follow up we may find that there is still blood flowing into the aneurysm. This is called an “endoleak”. Not all endoleaks need treatment.

An aortic aneurysm has several branches (small arteries) that come off it to supply the spinal cord and the bowel. In most cases treating the aneurysm with a stent will cause these small branches to block off, as blood is no longer flowing in the AAA but through the stent instead. There are lots of arteries which can take blood to these areas, so the body adapts and re-routes the blood supply.

Sometimes these arteries do not block off and the flow of blood reverses. Instead of blood flowing from the aorta to the organ, the blood flows back through the tiny artery into the AAA. This is called a “type II endoleak”.

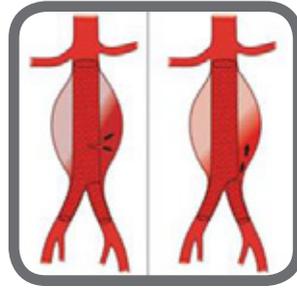


We see this type of problem initially in up to 1 in 5 patients treated with a stent. The vast majority of these either stop over time completely or cause no problem. We only consider treating these types of endoleaks if the AAA starts to grow again (“sac expansion”).

Sometimes a AAA can start to grow again because the stent is no longer “excluding” the aneurysm. This often happens when blood is coming around the side of the stent at the top or bottom “seals” (type I endoleak) or through one of the joins or the fabric of the graft (type III endoleak).



Type I endoleak



Type III endoleak

In this case we have to consider, with you, the pros and cons of a further procedure to re-treat the AAA. Usually this can be done using more complex stents. Rarely we may perform an open AAA repair, removing the stent and replacing it with a stitched in surgical graft.

Any patient who has a AAA repaired can have the following problems.

- Reduced sexual function
- Reduced blood supply to legs. If this happens we often must perform emergency surgery to correct the problem. The risk of losing a leg (major lower limb amputation) after any AAA repair is less than 1/100.
- Reduced blood supply to the pelvis. This occurs if the main blood vessel (internal iliac) supplying the pelvic organs is blocked off during the repair of the AAA. This is sometimes done intentionally when we treat an aneurysm that extends down into the pelvis (common iliac aneurysm). Not everyone who has a blocked internal iliac artery gets a problem – it is quite unpredictable.
 - The most common problem seen is lower back or buttock on walking (buttock claudication). This may last for a few weeks or months or can be permanent.

- Very rarely the blood supply to the skin around the buttock can be lost (skin necrosis).
- Reduced blood supply to the bowel in the pelvis. This leads to inflammation in the bowel (“ischaemic colitis”) which can progress to the bowel muscle dying and the bowel bursting. It is very uncommon for patients to have problems with the bowel in planned operations (1 to 2/100). The symptoms can be mild with diarrhea for a short period, to much more severe problems resulting in the need for emergency bowel surgery and a colostomy because the bowel has died or in the longer term narrowed up completely.
- Reduced blood supply to the spinal cord or nerves. This is very rare in patients having standard AAA repair (2/1000). This can result in weakness in one or both legs (paraplegia)
- Kidney failure/Dialysis (short term or long term)
 - This can be due to the stress the repair puts on the body, together with other factors (low blood pressure, drugs, x-ray contrast). This type of “acute kidney injury” usually recovers fully
 - The repair can cause one or more of the main arteries supplying the kidney/s to block off. This will produce a permanent reduction in the function of the kidney/s. This can lead to dialysis permanently.
 - Significant kidney problems occur after 1/100 standard EVAR and 4/100 open repairs.

- Aorto-enteric fistulas – unknown rate: much less than 1/100
 - This is a very rare complication that typically occurs many years after repair. This occurs when the graft used to repair the AAA sticks to the intestine and erodes into the bowel. This can cause life threatening bleeding or infection. This is usually seen only after open AAA repair. It is much more common after ruptured aneurysm repair than after a planned repair.
- Graft infection 2/1000
 - The grafts used for stents and for open repair are made up of man-made fabrics. It is possible for these grafts to pick up some bugs from the skin at the time of your operation or for bugs to stick to the fabric graft when you have an infection in the blood stream at some later time (for example a bad chest infection). These bugs slowly multiply over time and can cause a weakening of the joins around the stents or a collection of fluid around the graft. Such infection can sometimes be difficult to diagnose, and symptoms can range from feeling tired with flu-like symptoms to being very unwell with bleeding problems.
- Damage to other adjacent structures during the repair.

Balancing the benefits and risks



There is no doubt that EVAR carries much less risk around the time of the operation with a very speedy recovery, but in the long term you must keep an eye on the stent and you may need to have further procedures to keep your stent working.

Thinking about how the benefits and risk set out above apply to you is important. To make a shared decision with your specialist it is important that you read through the information and ask questions. This will help you to get the plan that is best for you.

**PATIENT
APPROVED** 



www.nbt.nhs.uk/vascularsurgery

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