Abdominal Aortic Aneurysm Open Repair

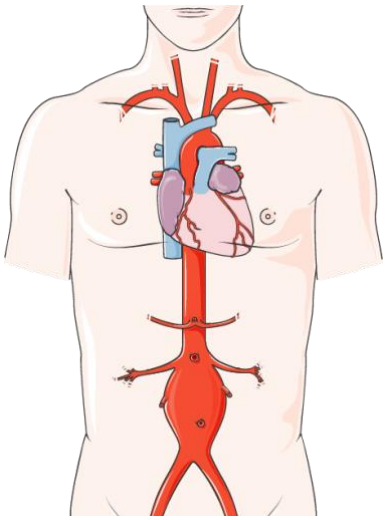
Introduction

The vascular team have developed this booklet to give you some information on the process of having your Abdominal Aortic Aneurysm repaired with open surgery and your expected recovery after discharge. Take your time reading the booklet; it is important that you feel able to take an active role in your recovery.

Our aim is to inform you about what to expect in hospital and prepare you for your recovery at home. It is not meant to replace discussions between you and your doctor

What is an Abdominal Aortic Aneurysm?

An Abdominal Aortic Aneurysm, (also known as AAA or triple A) is a wide, weakened part in your aorta - the largest artery in your body that carries blood to your abdomen (tummy), pelvis and legs. The aorta extends upwards from the heart in the chest (ascending thoracic aorta) then curves like a candy cane (aortic arch) downwards through the chest area (descending thoracic aorta) into the abdomen (abdominal aorta).



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The aorta delivers oxygenated blood pumped from the heart to the rest of the body. The most common area for an aneurysm to form in the aorta is in the abdomen, specifically, the segment below the kidneys. An abdominal aneurysm located below the kidney is called an infra-renal aneurysm. An aneurysm arising very near to the kidney arteries is called a juxta-renal aneurysm.

The decision to operate on an AAA depends on its size and risks involved with either fixing it or leaving it alone. Generally, once an abdominal aortic aneurysm reaches 5.5cm surgery is recommended to reduce the risk of the aneurysm bursting (rupture). A ruptured aneurysm is associated with a high risk of death and the larger the aneurysm, the greater the risk of rupture.

National Vascular Registry

It is important that we retain information about patients who undergo vascular surgery, including the repair of abdominal aortic aneurysms, in order to help improve surgical services.

We therefore ask all patients undergoing AAA treatment (or their nearest relative) to give permission for their personal information to be stored on the National Vascular Registry (NVR).

Analysis of data on the NVR, including the results of AAA surgery, enables us to monitor and compare the performance and quality of services throughout the country.

Although the database is a national system, strict data governance means personal details on the NVR can only be accessed by staff involved directly in an individual's treatment.

Patient information is confidential and is not passed on to third parties other than healthcare professionals directly involved in an individual's care.

If you have any queries about this then please discuss these and your decision to consent with the surgeon involved in your care.

DVLA advice on driving

Car or motorcycle driving licence holders (GROUP 1 ENTITLEMENT)
If you hold a car or motor cycle licence you will need to inform the DVLA if your abdominal aortic aneurysm reach **6 cm** in diameter. Licensing will be permitted subject to annual review.

Driving may continue after satisfactory blood pressure control or surgical treatment, without evidence of further enlargement. There should be no other disqualifying condition.
An aortic diameter of 6.5cm or more disqualifies you from driving.

Bus, Coach, or Lorry, driving licence holders (GROUP 2 ENTITLEMENT)
If you hold a bus, coach or lorry driving licence **(VOC-LGV/PCV)**, you will be disqualified from driving if the aortic diameter is 5.5cm or more. Driving may continue after satisfactory surgical treatment, unless other disqualifying condition.

If you require further information, please contact the DVLA

Why fix an AAA?

The reason an abdominal aortic aneurysm repair may be performed includes the following:

- To prevent rupture
- To relieve symptoms
- Emergency life-threatening hemorrhage (uncontrolled bleeding)

Even though the risk of rupture increases beyond 5.5cm, the decision to repair it will still depend on the individual's balance of risks of operating versus leaving it alone and not operating.

Types of abdominal aortic aneurysm repair

There are two approaches to abdominal aortic aneurysm repair. The standard surgical procedure for AAA repair is called the 'open repair'. An alternative less invasive procedure is the EndoVascular Aneurysm Repair (EVAR). The choice of technique depends on your fitness for surgery and the anatomy of the aneurysm. Your surgeon will have discussed this with you. This information booklet is about the OPEN repair.

How is the open repair performed?

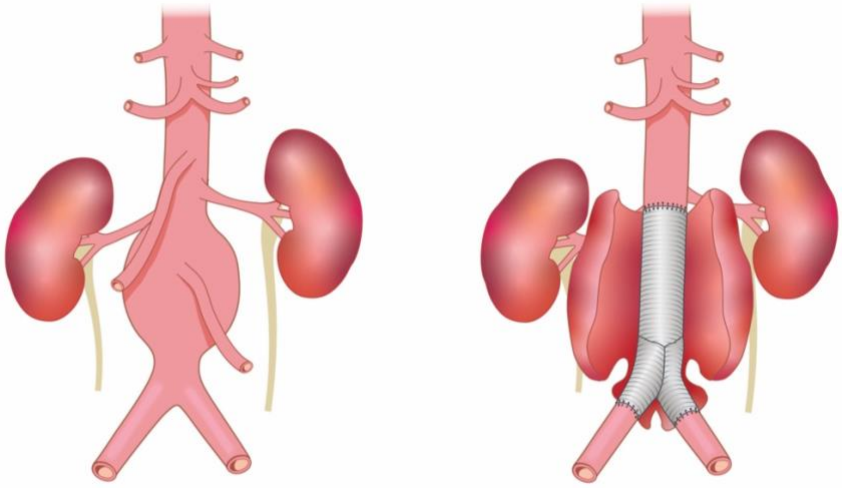
The procedure is performed in the operating theatre under a general anaesthetic (you will be asleep). The surgeon will make an incision (cut) either down the centre of your abdomen from immediately below the breast bone to below your navel or across your abdomen. The surgeon will then open the aortic aneurysm and repair it by inserting a cylinder-like tube called a graft. Grafts

are made of various materials and the commonest in use is Dacron (textile polyester synthetic grafts).

The graft is sutured to the aorta above and below the aneurysm (see diagram) and in some cases, the ends of the tube graft will be tunnelled through each groin and attached to the leg vessels. Your blood will then flow through the graft, and the aneurysm sac will gradually shrivel down around it. The abdomen cut will be closed with either dissolvable stitches or clips.

Surgery for AAA repair may take 4 hours or longer to perform and most patients recover in the intensive care unit (ICU) after surgery.

Open Abdominal Aortic Aneurysm Repair



Risks of the procedure

As with any surgical procedure, potential problems can occur during and after aortic aneurysm surgery. These fall into two categories: generalised complications and local complications. Both types of complication can prolong the stay in hospital and may be fatal if they are severe enough.

There is a risk of dying from open AAA surgery in the region of 5% but this depends on your general health and the complexity of the aneurysm and the extent of the open repair required.

Generalised complications

This means problems that occur away from the site of the operation and happen because a major operation under general anaesthesia has been performed.

The commonest types of generalised complications usually occur in the heart or lungs. They take the form of angina (chest pain), irregular heart rhythm, heart attacks and chest infections. In the majority of patients, especially those having a planned operation, these complications can be successfully treated. Impairment of kidney function can occur if the aorta has to be clamped above the arteries supplying the kidneys. This is usually temporary and will be monitored closely with regular blood tests.

Your intestines (bowel) may temporarily stop working (ileus) and cause abdominal distension - a large bloated tummy. This will settle with time and we may have to restrict what you eat and drink for a few days.

Another generalised complication that can occur with any operation is deep venous thrombosis (DVT). To help reduce the risk of DVT, antiembolic graduated compression stockings may be used, providing there is no evidence of hardening of the arteries in the legs. Intermittent compression of the legs and / or feet using airbags is sometimes used in theatre to improve blood flow in the leg veins during the anaesthetic.

Most patients also receive a daily tiny injection whilst in hospital to reduce the risk of blood clots forming. After your operation you will be encouraged to move around as early as possible.

Local complications

This means problems related to the site of the operation.

- The main early problem that can occur is bleeding at the place where the main artery has been joined to the artificial graft. This can be severe. The surgeon will stop all bleeding before completing your operation, but sometimes further bleeding can develop during the recovery period especially within the first 24 hours. If this happens a further operation may be needed to control the bleeding.

- Occasionally replacement of the major artery in the abdomen can lead to impairment of the blood supply to part of the bowel (colonic ischemia). If this becomes very severe then further surgery can be necessary to remove the damaged colon and form a colostomy to prevent further complications. The colostomy may be reversed later depending on the circumstances.

- Blood supply to your legs can be affected during or after the operation and limb ischemia (Loss of blood flow to the legs/feet) occurs. Following your operation your legs and feet will be monitored for any signs of lack of blood flow. Occasionally further surgery may be required to rectify this problem. Although it is rare, it can lead to the loss of limb (amputation).

- Rarely, after the operation, infection can develop in the artificial graft. If this does occur it can be a major problem and will probably lead to further surgery to fix the problem. Antibiotics will be given at the start of the operation and sometimes for one or two doses after the operation to help reduce the risk of this and other types of infection.

- Nerves controlling sexual function run very close to the aorta. Although attempts to preserve these nerves are usually made during an aneurysm repair they can be damaged. In men this can lead to loss of erections. If erections are preserved, retrograde ejaculation can take place where the semen is ejected into the bladder due to un-coordination of the various muscles. The effects of damage to the same nerves in women are not clear in the age groups that usually require this operation.

- In approximately 30% of patients a weakness can develop in the scar on the abdomen. If this happens it occurs months or even years after recovery from the original surgery. It can lead to bulging in the abdominal wound and the development of an incisional hernia (Incisional hernias result from a weakening of the abdominal muscle due to a surgical incision.)

This seems to be more common in aneurysm patients and may require a further operation. Your vascular consultant will explain your risks depending upon your specific medical condition. It is important that you discuss any concerns you may have with your vascular surgeon before the operation.

COVID-19

A recent COVD-19 infection increases your risk of lung complications or death if you have an operation under general anaesthetic. This risk reduces the longer it is since the infection. After 7 weeks the risk is no higher than someone who has not had COVID-19. However, if you still have symptoms the risk remains high. The risk can also depend on your age , overall health and the type of surgery you are having.

You must follow instructions to self-isolate and take a COVID-19 test before your operation. You will be sent for a PCR test prior to your admission. If you have had COVID-19 7 weeks before the operation you should discuss the risks and benefits of delaying it with your surgeon.

What happens before the procedure?

If you smoke, you should stop as soon as possible, ideally at least 9 weeks before your operation. This will help improve your chances of a successful recovery and to improve your overall health status. If you require further information the Vascular Nurse Specialists can talk to you and provide further support.

Your consultant or a senior member of his team (Registrar) will explain the procedure to you and offer you the opportunity to ask any questions that you might have about the procedure.

Inform them of any of the following:

- If you are sensitive to, or are allergic to any medications, latex, iodine, tape, contrast dyes or any anaesthetic agents (local or general)
- All medications (prescribed, over the counter or herbal supplements) you are taking
- If you have a history of bleeding disorders

If, you are taking medications, that thin your blood (such as clopidogrel, warfarin, rivaroxaban, Aspirin or apixaban), it may be necessary for you to stop taking these medications prior to your operation.

If you are having a planned AAA repair the following investigations will be required. This will help give the Consultant information he needs to make a decision on the best procedure with as fewer risk of complications for you:

- CT scan
- Bloods – especially looking at your blood count and kidney function
- Echocardiogram - looking at your heart
- Respiratory function test - looking at your lungs
- Cardiopulmonary exercise test (CPET) which is done on a bike – To assess your fitness for surgery

Further investigation may also be needed depending on your personal medical history.

As part of your pre-operative assessment, you will be seen by a consultant anaesthetist who will explain about the type of anaesthesia you will be having.

Day of surgery

- You will be asked not to eat anything six hours prior to your operation and stop water 2 hours prior to your operation.

- You will be asked to remove any jewellery or other objects that may interfere with the procedure. Please DO NOT bring valuables or large amounts of money into hospital. The hospital will not accept responsibility for any loss or damage caused during your stay.

- You will be asked to remove your clothing and will be given a gown to wear.

- You will be asked to empty your bladder prior to the procedure.

- You will be seen by your consultant or a registrar and the procedure explained to you. You will be asked to sign a consent form. Please ensure you read this carefully and ask any questions you may have. An anaesthetist will also see you to explain the anaesthetic technique.

What happens during the procedure?

An intravenous (IV) line (drip) will be started in your arm or hand. Additional catheters will be inserted in your neck and wrist to monitor the status of your heart and blood pressure, as well as for obtaining blood samples. Alternate sites for the additional catheters include the subclavian (under the collarbone) area. An epidural catheter will usually be placed in your back so that your abdominal wound is more comfortable after the operation and you can breathe easier.

You will be positioned on the operating table lying on your back. The anesthetist will continually monitor your heart rate, blood pressure, breathing and blood oxygen level during the surgery. Once you are asleep, a breathing tube will be inserted through your throat into your lungs and you will be connected to a ventilator which will breathe for you during surgery.
A urinary catheter will be inserted into your bladder – this allows us to monitor the function of your kidneys.

The skin over the surgical site will be shaved and cleaned with an antiseptic solution and a sterile drape positioned to keep the operation as clean as possible.

Once all the tubes and monitors are in place, the surgeon will make an incision (cut) either down the centre of the abdomen (tummy) from immediately below the breast bone to below the navel or across the abdomen.

The surgeon will place a clamp on the aorta above and below the site of the aneurysm. This will temporarily interrupt the flow of blood. Your surgeon will then cut the aneurysm sac and remove any thrombus (blood clot) that is in the sac and sew into place a long tube called a graft. This will connect both ends of the aorta together. The clamps will then be removed and the surgeon will then wrap the wall of the aneurysm around the graft.

At the end of the operation the abdominal wall and skin will be sutured together and covered with a dressing.

What happens after the procedure?

After the procedure you may be taken to the recovery room before being taken to the High Dependency Unit (HDU) or Intensive Care Unit (ICU) to be closely monitored. You will be connected to monitors that will constantly display your heart tracing, blood pressure readings, breathing rate and your oxygen level.

Occasionally, not routinely, you may have a tube in your throat so that breathing can be assisted with a ventilator (breathing machine) until you are stable enough to breathe on your own. As you continue to wake up from the ananaesthic and start to breathe on your own, the breathing machine will be adjusted to allow you to take over more of the breathing.

When you are awake enough to breathe completely on your own and you are able to cough, the breathing tube will be removed.

After the breathing tube is out, your nurse will assist you to cough and take deep breaths every two hours. This may be uncomfortable but it is extremely important that you do this in order to stop mucus from collecting in your lungs and possibly causing pneumonia.

Your nurse or physiotherapist will show you how to hug a pillow tightly against your abdomen while coughing to help ease the discomfort.

You will receive painkillers as needed either by a nurse, through an epidural catheter or by administering it yourself through a device connected to your intravenous line (IV).

You may be on special IV medications to help your blood pressure and your heart. As your condition stabilizes, these medications will be gradually decreased and discontinued as your condition allows.

When your Vascular Surgeon determines that you are ready, you will be moved from the ICU to a High Dependency Unit or back to the vascular ward. Your recovery will continue to be monitored. Your activity will be gradually increased as you get out of bed and walk around for longer periods of time and your diet will return to normal as tolerated.

Helping you plan for discharge home

Preparing for home should start as early as possible. Discharge is usually planned for between 7-10 days after the operation. It is a good idea to have someone to help look after you for a while. Some patients choose to live with a member of their family for a short time. Think about the tasks, or activities you do, which may be difficult, especially if you have a caring role for someone else. Stocking up on frozen or tinned food items means you do not need to go shopping immediately.

If there are complications with your recovery you may need to stay in hospital a little longer.

What can I expect when I get home?

Recovery times vary and it can take several weeks to months to feel fully ‘back to normal’. This depends on your health and level of activity before surgery. Your wound will be red at first but will gradually fade over six months or so. You can wash normally with mild soap and water when you have a bath or a shower. If your wound becomes red, sore or is oozing please let your GP know, as this could be a sign of an infection.

Managing Pain

Your hospital doctor will prescribe pain medicines to use at home. If you are taking painkillers 3 or 4 times a day try taking them at the same times each day for 3-4 days. They are more effective this way. Try getting up and moving around if you are having some pain in your abdomen, this may ease the pain. In the early days at home, if you need to cough or sneeze you may find pressing a pillow over your incision will ease discomfort and protect your incision.

Medication

Whilst you are in hospital there may be some changes to your regular medication. Please check the names of medication you are being discharged home with. If you are unsure what they are for then please ask a doctor looking after you before you go home. Your doctor may recommend you take a medication to lower your cholesterol (statin) and a drug to help thin your blood (aspirin or clopidogrel). This is thought to help the blood flow through your arteries more easily and reduce your risk of heart attacks and stroke.

Sleeping and feeling tired

It is normal to feel tired for at least 6 to 12 weeks after your operation and you may feel low in spirits. You will probably find it beneficial to have a short sleep in the afternoon for a few weeks until your body gradually recovers from the surgery and your level of activity increases. It is good for you and your family to be aware of this and not to worry.

Diet/appetite and bowel movement

It can take a few weeks for your appetite and diet to return to normal and to regain any weight you may have lost in hospital. Try taking smaller regular meals and eat what you fancy when you want to until your appetite returns back to normal. You may find your bowel motions take time to become more regular again. This is usual after surgery because of pain killers and poor mobility.

Mobility, hobbies and activity

Do not overdo any activity, as it should be gradually increased. It is important you do not lift heavy objects or push heavy objects for 2-3 months. This is because the muscles underneath your wound may take this long to fully heal. By being a little cautious will help reduce the risk of a hernia developing. Taking on light household chores, and gentle walks around your house is a good starting point in the early few weeks.

You may resume gentle sports, such as golf or crown green bowling when you feel comfortable to do so. Taking regular exercise such as a short walk combined with rest is recommended for the first few weeks which you can gradually increase.

Building up your strength and stamina exercise routine

Here are some tips for planning your exercise at home however this is just a guide. You can increase the time and level of activity depending on how you feel:

Week 1. Walk gently around the house, stand up straight avoiding crouching over, sit down when you begin to feel tired. You will probably feel like having an afternoon nap.

Week 2, Take 5 minute small walk at least twice a day around your house or garden. Take an afternoon nap, if needed.

Week 3. Take a couple of short 10 minute walk around the house, garden or outside (if you feel strong enough) in the morning and afternoon. Take a nap in the afternoon if needed.

Week 4. Take a 20 minute walk, at least twice a day. You may also still need a daily nap.

Driving

For safety reasons patients are advised not to drive for at least 4 weeks after their operation. You may drive when you are able to perform an emergency stop without discomfort or any hesitation and this is usually 4-8 weeks after the operation. If you are in doubt, you should check with your GP and insurance company.

Working

When to return to work will depend on the type of job that you do. Most people need to wait 8 - 12 weeks before returning to work, and may work shorter hours for a few weeks, before increasing to your normal hours.

Your HR or Occupational Health Department will be able to advise you on a fazed return to work program.

Sex

You can resume your sex life when you feel comfortable. Sometimes, men have problems sustaining an erection but this is rare. Slightly more common is retrograde ejaculation, a condition where seminal fluid passes back into the bladder. Men with this condition can still experience an orgasm but no fluid comes out (dry sex). If you experience any problems, your GP may be able to provide treatment to help.

Complications and what to look out for:

Occasionally complication can occur due to the nature of the operation.
Bruising and swelling around the wound may be troublesome but should take 4-6 weeks to settle.
Infection can happen and usually settles with antibiotic therapy. If you think that there is something wrong with your wound at home contact your GP.

Aches and twinges may be felt for up to 6 months following surgery.

Occasionally there are numb patches in the skin which will improve over the following months.

Notify your GP if you have any of the following:

- Fever and/or chills
- Redness, swelling, bleeding or other drainage from the incision site
- Increase in pain around the incision
- Pain in your legs when walking
- Continued poor appetite
- Continued upset bowel movements.

When to get urgent medical help:

Rarely complications can warrant urgent medical treatment; this may not be directly related to your surgery. Seek immediate help if you experience any of the following:

- Your stitches come apart
- Your incision is swollen, red and hot to touch or has puss coming from it.
- If you develop sudden pain or numbness in your legs that does not get better within a few hours, or your feet become very cold or turn pale or blue.
- You have severe pain in your chest, abdomen or side.
- You have severe chest pain or trouble breathing that is getting worse over time
- You suddenly feel light headed and have trouble breathing.
- Any shortness of breath or pains in your chest.

In case of an emergency dial 999

If you have any other concerns or questions during your recovery at home you can contact the vascular discharge helpline on; 0121 424 2879. This is an answer machine service which is

listened to 3 times a day, Mon – Fri except bank holidays by the Vascular Clinical Nurse Specialist. Message left after 4pm on a Friday will be answered the following Monday. One of the team will aim to call you back the same day. Make sure you leave your name, telephone number and hospital or NHS number if you know it.

Outpatient follow- up

After an open repair the recovery is slower, but the need for long term follow-up is less. You may be seen in the vascular clinic 4-6 weeks after your discharge. Remember to bring a list of any queries you might have.

You will not need a scan to check your graft, but the doctor will ask you a few questions on how you have been doing. Once you have recovered from your operation, you will be discharged back to the care of your family doctor.

Looking after yourself

Aneurysms are often caused by arterial disease or atherosclerosis also known as ‘hardenings of the arteries. There are certain factors that make people more at risk from atherosclerosis of peripheral vascular disease.

These include:

- Age
- Smoking
- High blood pressure
- High cholesterol
- Diabetes
- Being overweight
- Lack of exercise

Part of your medical treatment will be to reduce these risk factors:

Stop Smoking

Smoking is a major risk for arterial disease and having a fatal heart attack or stroke. It also increases the chances of getting a chest infection and slows your recovery. We can help you to stop smoking and refer you to our smoking cessation nurse, who may suggest tablets or patches to help you quit. Alternatively, you can get support from your practice nurse at your GP surgery or most local chemists provide smoking cessation services.

Eat Healthily

Being overweight reduces your general mobility and can slow your recovery. Eat well, according to your appetite. Concentrate on low-fat foods and try to include your 5 portions of fruit and vegetables a day.

Exercise

Exercise can boost your immune system and improve recovery. Take regular exercise or short walks every day as we have previously suggested. Take a nap if needed. As you recover try to increase your activity.

General information

The operation may sound complicated but it is an everyday procedure for us. It is important that you understand your condition and treatment options, if you still have any queries please do not hesitate to ask.

The vascular team would like to sincerely thank the patients and their partners who helped in producing this information booklet and the Circulation foundation for permission to use the images shown.

Additional sources of information:

The Vascular Surgical Society of Great Britain and Ireland website (**http://www.vssgbi.org**) has further information on vascular surgical procedures.

http://www.circulationfoundation.org.uk/ The Circulation Foundation provides information on all common vascular diseases and their treatments. Their aim is to provide an educational service and is not designed to offer specific medical advice.

If you have any concerns or questions after your discharge from hospital you can call the:

Vascular Discharge Helpline on 0121 424 2879

Accessibility

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