Enhanced recovery after surgery to repair an abdominal aortic aneurysm (AAA)

Information for patients, families and carers
Enhanced recovery after surgery to repair an abdominal aortic aneurysm (AAA). The enhanced recovery programme is an evidence-based approach that is designed to help people recover more quickly from surgery. Research shows the earlier a person gets out of bed and starts walking, eating and drinking after having an operation, the shorter their recovery time will be. The enhanced recovery programme aims to enable you to be well enough to go home within five to seven days of your operation.

This booklet has been given to you because you are due to have surgery to repair an abdominal aortic aneurysm (AAA). The enhanced recovery programme is an evidence-based approach that is designed to help people recover more quickly from surgery. Research shows the earlier a person gets out of bed and starts walking, eating and drinking after having an operation, the shorter their recovery time will be. The enhanced recovery programme aims to enable you to be well enough to go home within five to seven days of your operation.

This booklet is designed to explain your surgery and the enhanced recovery programme in detail, so that you and your family know what to expect before, during and after you have your operation. It explains the things that you can do to help prepare yourself and helps you to take an active part in your recovery.

What is an abdominal aortic aneurysm?
An abdominal aortic aneurysm (AAA) is a swelling (aneurysm) of the aorta – which is the main blood vessel that leads away from the heart, down through the abdomen (stomach area) to the rest of the body. An aneurysm occurs when the wall of a blood vessel is weakened and balloons out. In the aorta (where most aneurysms occur) this ballooning makes the wall weaker and more likely to burst (rupture). If a rupture occurs this is a life threatening event.

Aneurysms can affect people of any age and both sexes. However, they are most common in men, people with high blood pressure (hypertension) and those over the age of 65. In most cases, the exact reason why an aneurysm forms in the aorta is not clear. However, the wall of the aorta normally has layers of supporting tissues, and as people age they may lose some of this tissue. This is thought to explain why aneurysms are more common in older people. You have a much higher chance of developing an AAA if one of your immediate relatives (parent, brother or sister) has or had one. Certain other ‘risk factors’ increase the chance of getting an aneurysm. These include: smoking, high blood pressure, high cholesterol, emphysema (a form of lung disease) and being overweight (obesity).
Deciding whether to repair an AAA with surgery
The chance of bursting (rupturing) is very low for small AAAs. For aneurysms measuring less than 5.5cm in diameter, the risk is less than 1 in 100 per year. As aneurysms get larger than 5.5cm, the risk of rupture increases and it is usually at this size that the option of surgery is considered. Each individual’s risk from their AAA and from surgery may be different. Any decision on treatment will be carefully considered by your vascular team (who specialise in conditions affecting the circulation, including arteries and veins), and discussed in detail with you and, when appropriate, your family. Repair of an AAA is a surgical procedure that is usually carried out when the risk of an AAA rupturing is higher than the risk of an operation. Your aneurysm has reached a size at which surgery is considered the best option for you. This booklet provides information about this form of treatment. It is not meant to be a substitute for discussion with your vascular specialist team.

The surgery
During the operation the surgeon will make a cut either down or across your abdomen (occasionally a smaller cut may be also needed in one or both groins). The enlarged segment (aneurysm) will be removed and replaced with an artificial piece of blood vessel (graft) made of synthetic tubing. Once the graft has been sewn into place the aneurysm sac is closed over the graft for further protection. The wounds will be closed with either stitches or clips that are removed about ten days after the surgery.

This is a major operation and carries some risk. However, it is successful in most cases and the long term outlook is good.

What are the risks of surgery?
An aortic aneurysm repair is a large operation and as with any major operation there are risks involved. Your surgeon and anaesthetist will discuss these with you. The risks will vary with each patient and depend on your health and any other conditions you may have, but include:

- heart attack
- stroke
- kidney failure
- chest/breathing problems
- loss of circulation in the legs or bowel
- infection in the graft used to replace your aorta

Although they are uncommon, these risks do mean that some patients may not survive their operation or the immediate post-operative period. In this hospital, the risk for AAA open repair is about 3% - in other words 97 in every 100 patients will make a full recovery. If your risk of a major complication is higher than this, (usually because you already have a serious medical problem), your surgeon will discuss this with you.
It’s important to remember that your surgeon will only recommend an operation to repair your aneurysm if he or she believes that the risk of the aneurysm bursting is higher than the risk of the operation.

Other possible complications:
- Up to 1 in 10 men may have difficulty keeping an erection or ejaculating following surgery, due to injury to the nerves which lie on the front of the aorta.
- Deep vein thrombosis (DVT, also known as blood clots) - you will be given treatment during your stay in hospital to prevent this.
- Chest infection (particularly if you smoke).
- Wound infection – this can usually be treated with antibiotics, but it’s possible that you will need to have another general anaesthetic while the wound infection is cleaned.
- Graft infection – this is a very rare but serious complication requiring long term antibiotics and removal of the graft.
- Fluid leak from wound – occasionally the wound may leak a clear/yellow fluid called lymph. This usually settles in time but may take several weeks.
- There is a small risk of developing a hernia (when an internal part of the body pushes through a weakness in the muscle or surrounding tissue) at the wound site in future years.

Your surgeon will be happy to discuss these risks with you, or answer any questions that you may have.

Is there anything I can do to prepare for the operation?
There are things that you can do to make yourself fitter for this operation, and also reduce the risk of developing further disease caused by atherosclerosis (which is a potentially serious condition where the arteries become clogged up by fatty substances known as plaques). These include:

**Stop smoking**
Smoking is a major risk for arterial disease (disease affecting the arteries), and also increases the chances of getting a chest infection and slows your recovery. We can help you to stop and refer you to our smoking cessation counsellor, who may suggest tablets or patches to help.

**Exercise**
Exercise can boost your immune system and improve recovery. Gentle exercise such as walking and cycling are recommended to help to improve your overall level of fitness.

**High blood pressure**
High blood pressure is a known risk factor for rupture of aneurysms. It’s very important that you have your blood pressure checked regularly. If you have been prescribed medication for high blood pressure you must make sure that you take it according to the instructions you have been given.

**Diabetes**
If you have diabetes it’s important that your blood sugar levels are well controlled.

**High blood cholesterol levels (fatty substance in your blood)**
It’s important to reduce the level of cholesterol in your blood. You should eat a healthy, balanced diet and try to reduce any excess weight. You will be given advice on how to do this, and your vascular specialist nurse can refer you to a dietician if needed. Your surgeon will also request that your GP starts you on low dose aspirin 75mg and simvastin 40mg (or an alternative) to further reduce your risks from surgery. These medications will continue following your surgery and you will need to take them for life.

**Driving**
If you have a small AAA (less than 5.5cm) you are allowed to continue to drive. The DVLA should be notified if your aneurysm reaches 6cm in diameter and you are allowed to continue to drive if you have had satisfactory medical treatment and there is no further enlargement of your AAA.

If your AAA reaches 6.5cm in diameter you are disqualified from driving, however HGV drivers are disqualified from driving if their AAA is bigger than 5.5cm.

Once you have had your surgery you can start driving again. Contact the DVLA for more information.
Before your surgery

Pre-assessment
Before you are admitted for surgery you will be seen by the vascular nurse specialist and a consultant vascular anaesthetist in clinic. Here a detailed medical history will be taken. You will also have a blood test and a physical examination, your blood pressure checked and an ECG (heart trace). The anaesthetist will talk to you about your anaesthetic and explain what drips or monitoring equipment may be used and how your pain will be controlled. You will also be screened for MRSA, which is a type of bacterial infection that is resistant to a number of widely used antibiotics. Two swabs will be taken, one from your nose and one from your groin. If either of these are positive we will contact you and your GP with more information. If any further tests are required they will be arranged following your pre-assessment appointment, before your admission for surgery. You will also be told about any changes to your medication that are required before your surgery.

Reducing the risk of MRSA infection
Many germs can live on the skin of healthy people, including MRSA. Usually they do not cause any problem, but if they get into a wound or the blood they can cause infection.

To reduce the risk of MRSA infection, at your pre-assessment appointment you will be given a special pink disinfectant soap to wash with (Chlorhexidine 4% liquid).

When to use the liquid soap
You must use the soap:
• for two days before your operation
• on the morning of your operation
• and for two days afterwards (five days in total) – so remember to bring the liquid soap with you when you come in for your operation

How to use the liquid soap
• Do not dilute the soap as this will make it ineffective.
• Wet the skin and apply directly onto your skin using a clean wet cloth or hands (preferably under a shower but you can also do it in the bath).
• Wash from head to toe, avoiding your eyes.
• Pay particular attention to folds of skin, such as under your arms and your groin area. Leave the soap on your skin/hair for 60 seconds before rinsing off from head to toe.
• Dry using a clean towel and dress in clean clothes.

Following these instructions will help stop any harmful bacteria settling on your skin which could cause an infection. If you would like further information, ask the nurse or doctor looking after you. You could also ask for a copy of the more detailed MRSA leaflet, which should be available on all wards.

Consent to store your personal information
Vascular surgeons record information about surgical interventions, including AAA repairs, on the National Vascular Database (NVD). This is a secure database that is used to help monitor and improve vascular services throughout the country. Therefore, you (or your nearest relative) may be asked to give permission for your personal information to be stored on the NVD. Although the database is a national system, strict data governance and confidentiality rules mean that personal details and information about you on the NVD can only be accessed by staff directly involved in your treatment. You need to confirm with your vascular surgeon whether you are happy for them to store your personal information on the NVD.

On the day of your admission
You will usually be admitted to hospital the day before your operation is planned. You will receive a letter confirming your admission date generally two to three weeks before your surgery. This will ask you to telephone the ward on the day of admission at around midday to confirm there is a bed available for you. We aim to admit you to the vascular ward (D4), but sometimes, due to emergencies, we may have to admit you to a different ward instead.
When you telephone, we’ll confirm which ward you’ll be admitted to, and tell you what time to come to the hospital. Please do not leave home for the hospital until your bed has been confirmed.

Unless you are informed otherwise, your operation will be the following day. We won’t be able to tell you what time it will be until the operating list is distributed at approximately 4.30pm.

Being admitted the day before allows time to prepare you for surgery. You will meet your surgical team and anaesthetist and sign a consent form. Your skin may be marked with a pen to identify the site of your operation and you will not be allowed to eat or drink anything for a period of time before your operation (‘nil-by-mouth’).

Unfortunately we do sometimes have to cancel procedures. If this happens to you, we will always try to explain the reason. We fully appreciate that this is a stressful time for you and your family and we will do our best to provide you with a new date that is convenient for you as soon as possible.

On the day of your operation you will take a bath or shower using the pink antibacterial liquid soap. You may be given a ‘pre-med’, consisting of tablets together with some of your normal medication depending on your anaesthetist’s advice. You will be given two cartons of ‘PreOp’ drink at 6am and if you are on the afternoon list you may be given a further two cartons at midday. The nursing staff will let you know when to stop eating and drinking as this will depend on your position on the operating list. You will then be taken to the operating theatre department on a trolley and then on to the anaesthetic room where you will be anaesthetised for your surgery.

During your operation a number of other tubes, lines and drains will be inserted while you are asleep, which you will be aware of when you wake up. These include:

- A drip in the side of your neck and in each arm. These are used to both monitor you and give you medications.
- A small tube in your bladder to drain your urine, called a urinary catheter.
- A drip in your side. These are used to both monitor you and give you medications.
- A drip in your arm. These are used to both monitor you and give you medications.
- A drips in your head. These are used to both monitor you and give you medications.
- A drip in your hand. These are used to both monitor you and give you medications.
- A small tube in your bladder to drain your urine, called a urinary catheter.
- A small tube in your bladder to drain your urine, called a urinary catheter.

You will also be attached to the ECG monitor which measures the electrical activity in your heart, a blood pressure cuff and an oxygen monitor.

**After the operation**

From the recovery area of theatre you will go to either the high dependency or intensive care area for 24 to 48 hours where you will be closely monitored.

You will have a number of special tubes:

- **A drip** – to give you fluids directly into a vein. At this time you will not be able to eat or drink.
- **Naso-gastric tube** – a plastic tube which goes through your nose to your stomach to help drain away the contents so that you don’t feel sick. It is removed when your gut is working.
- **Wound drain** – a tube into your tummy so that any old blood (haemotoma) can drain away. It is removed when the drainage has stopped.
- **Urinary catheter** – a tube into your bladder to drain urine. The drainage is measured closely by the staff.
- **Oxygen mask** – for a few days you will be given oxygen via a mask.
- **Epidural or PCA** – an epidural is a fine tube that is placed into your back and is attached to a pump, which gives you drugs to control any pain. A PCA (patient controlled analgesia) is a special drip that goes through a pump to give you pain relief. Either of these two methods will be used to ensure your pain is controlled.
- **Your pulse, blood pressure, temperature, breathing rate and heart rhythm** will be very closely monitored.
- **Your wound** will have a dressing on it and be regularly checked.

**Your recovery on the ward**

After 24 to 48 hours in the intensive care unit (ICU), when your condition is stable you will return to the ward. You may still have oxygen, a drip, a urinary catheter and pain relief direct into a vein.
Pain
The incision (cut) in your abdomen is likely to be uncomfortable at first. The pain relief methods explained on the previous page will help to control any pain or discomfort.

Once you are eating and drinking, you will be able to take pain relieving tablets by mouth. The pain will slowly improve, but you may get twinges and aches for between three to four weeks. It’s important your pain is controlled so that you can cough well and move about.

Eating and drinking
Once you are awake and as long as you are not feeling nauseous or being sick you will be allowed to drink clear fluids, and once you are drinking enough, your drip will be discontinued.
You will then move onto a combination of a light diet and nutrition support drinks as below:

Day 1 – clear fluids as tolerated and three Fortisip/Fortijuice drinks
Day 2 – light diet and fluids and three Fortisip/Fortijuice drinks
Day 3 – light diet and fluids and three Fortisip/Fortijuice drinks
Day 4 onward until discharge – full diet and fluids plus three Fortisip/Fortijuice drinks

Once home you may find you are not very hungry and don’t feel like eating much.

It’s important to eat regularly to help your recovery. Small regular, high calorie meals are better than one large meal a day. You will lose weight following your surgery, often up to 2.2kg (1 stone). This will stabilise but may take several weeks.

Bowels
It’s common to not have a bowel movement for several days after the operation, and you may find it takes several weeks to return to your normal bowel habit. You may find that your bowel motions are initially loose (this should settle within a couple of weeks once you are eating properly). You may get constipation (a common side effect of pain relief medications). If you do have problems, medication can be prescribed by your GP to help.

Passing urine
Initially you will have a urinary catheter which will have been placed into your bladder during your surgery to monitor your kidney function. This will be removed about 24 hours after your surgery as long as you are able to use a commode or urinal and you are passing enough urine. Sometimes passing water may be difficult or a little uncomfortable after the catheter is removed. This should settle within a couple of days but the nursing staff will monitor your progress.

Your wound
There will be a dry dressing over your tummy wound. The stitches will usually be removed between seven to ten days after the operation, though sometimes a special dissolvable stitch is used; your nursing staff will inform you if this is the case. You will probably be back home by the time your stitches need to come out, so the ward will arrange for them to be removed at your GP’s practice or by your district nurse. You’ll have your wound checked for any signs of infection at the same time. The wound will appear to have healed within two weeks or so, but the underlying tissues can take several months to heal completely and you may find the scar and wound are lumpy and quite hard for several months.

Following your surgery you may have bruising over your abdomen. This is normal and will disappear within a couple of weeks. You may also get swelling around the lower part of your abdomen and genitals. This should also get better within a week or so but sometimes can take a little longer. A cool
pack such as a bag of frozen peas wrapped in a tea towel may help to relieve any discomfort. You may also notice that there are areas of numbness or oversensitive areas around the wound. This is also normal.

Moving around
Moving around after surgery will help speed up your recovery and prevent complications. We’ll help you to start moving around and walking again as soon as possible. Even when you’re in bed it’s important to move your legs and take deep breaths and cough to prevent blood clots (DVT) and chest infections.

Your physiotherapist will help you to cough and breathe, and will give you any individual assistance you need to regain your normal mobility. Moving around will not cause any damage to the graft or to your wound.

Day 1 – sit out of bed for one hour minimum morning and afternoon
Day 2 – sit out for six hours throughout the day and aim to walk 50 metres (assistance will be given if required)
Day 3 – sit out for six hours throughout the day and aim to walk 100 metres
Day 4 – increase your mobility as much as you can, and aim for 100 metres plus stairs
Day 5 onwards – increase mobility as much as you can, try to achieve more each day

Medication
The doctors will review your medication (for example blood pressure tablets) before you leave hospital. Most people will be sent home on a small dose of aspirin, to ensure the blood is less sticky and a statin to reduce your cholesterol levels. If you’re unable to take aspirin an alternative drug may be prescribed.

Your recovery at home
Recovery times vary, and it can take several weeks to feel ‘back to normal’. It also depends on your health and activity before surgery. Before going home, an occupational therapist may assess you to see if you are having any difficulties with any activities of daily living or if you require any equipment to help you to return to normal. The physiotherapy team will give you some general exercises to improve your strength and the length of time you can do exercise for.

Your wound
Your wound will be red at first but will gradually fade over six months or more. You can wash normally with mild soap and water when you have a bath or shower. If your wound becomes red, sore or is oozing please let your GP know, as this could be a sign of an infection. Protecting your scar from exposure to sunlight during the first year after having surgery will prevent the scar becoming darker.

Sleeping and feeling tired
It’s normal to feel tired for at least four to six weeks after your operation. You might need a short sleep in the afternoon for a few weeks, as you gradually increase your level of activity. You may feel low in spirits for a while, so it’s good for you and your family to be aware of this.

Diet and appetite
Try to eat small, regular meals. 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.
**Mobility, hobbies and activity**

It's important to start slowly. The muscles underneath your wound may take up to six to eight weeks to heal completely. During this time you should not lift heavy objects, or do any strenuous activities or sports. Walking is an excellent form of exercise not only for your muscles but also for your heart and lungs. As a guide, take it easy at first. You will tire easily and will need to rest but do not stay in bed. Some days you will feel better than others. Go for a short walk for about five minutes. If you feel fine build up your time by five minutes a day until you are walking for one to two miles a day. You should be able to talk at the same time as walking. If you are unable to do this you are probably doing too much and need to cut back slightly.

Remember do not try and do too much too quickly. You will be able to manage light work around the house, in the garden and at work when you feel fit and able. However, avoid any heavy lifting for the first six weeks after your operation. Activities like vacuuming, mowing the lawn and carrying shopping should be avoided for the first four to six weeks. Excessive activity will cause pain rather than actual damage. This is nature’s way of telling you to slow down.

**Working**

If your job involves heavy lifting ask for advice from your consultant at your first outpatient appointment. When to return to work will depend on the type of job that you do. Most people need to wait six to twelve weeks before returning to work, and may work shorter hours for a few weeks, and build back up to their normal hours. Your GP will be able to advise you further.

**Sex**

You can resume your sex life when you feel comfortable. Up to 10% of men have problems keeping an erection after this operation, as the nerve supply may be disturbed. It's not known what effect, if any, AAA repair has on a woman’s sex life. If you experience problems, your GP or consultant will be able to refer you to a specialist.

**Driving**

You can start driving as soon as you are able to do an emergency stop. You can practise this in the car without the engine on. If you drive a manual car you need to be able to lift both legs at the same time to push down on the brake and clutch, quickly and forcefully. If this causes you pain, then you are not ready to drive yet. Sometimes this can take up to six to eight weeks after your operation. If you are in doubt, you should check with your GP and insurance company.

**Exercises**

Exercising after your operation will help your recovery and allow a quicker return to a normal daily life. It will stop you from stiffening up, strengthen your muscles and can also give you a general feeling of wellbeing, help you to regain normal posture and improve your strength and fitness. It’s easy to develop poor posture after an operation, so it’s important to stand and sit up straight at all times to prevent this. When you first stand up you may feel some pulling on your stomach wound. This is normal. As scar tissue forms, it shrinks; so it’s very important to stand tall with your shoulders back, not leaning forwards. Standing in front of a mirror can help you to check on your posture.

**Position in bed**

If you are required to spend long periods in bed, ensure you are in a good position. This means sitting upright in bed or lying on your side. It’s important to change your position every two hours to minimise the risk of pressure ulcers. Do not slump in bed as this will increase the risk of getting a chest infection.

**Pain relief**

Make sure that your pain is under control. Some discomfort is normal, but if it’s affecting your breathing or movement, ask your nurse to provide you with more pain relief.
Breathing exercises
To start with, due to pain and tiredness, deep breathing may be difficult. This can lead to closure of small areas in your lungs. Phlegm may also build up and can cause a chest infection. To avoid this you need to do breathing exercises every hour.

The active cycle of breathing technique (ACBT) is a breathing technique used to clear phlegm and reinflate your lungs. It has three parts:

- breathing control
- deep breaths
- huff or cough

Your physiotherapist will advise you on how often you will need to do your breathing exercises but it’s usually once every hour that you are awake.

Firstly, find a comfortable well supported position, ideally sat out in the chair or sitting upright in bed. Relax your neck, upper chest, shoulders and arms.

Breathing control
- Rest your hand lightly on your stomach.
- Breathe in and out quietly and gently through your nose if you can.
- As you breathe in, your stomach should rise.

Deep breaths
- Deep breaths help to get the air behind the phlegm that is stuck in your airways. Try to hold each deep breath for the count of three as this will also help to reinflate your lungs.
- Take a long, slow deep breath in through your nose and out gently through your mouth.
- Try to breathe right down to the bottom of your lungs, expanding your ribcage.
- Aim to do three to four deep breaths before returning to breathing control.

Huff
- A huff is similar to a cough but you aim to keep your mouth and throat open.
- Imagine you are trying to steam up a mirror right in front of you.
- Take a breath in and then force the air out quickly, keeping your mouth open.
- If you wheeze as you exhale you are huffing too hard.

Cough
- After doing a huff you may need to do a good strong cough and bring your phlegm out into a pot or tissue. When coughing and huffing, always use a rolled up towel to support your wound, hugging it in firmly. This will make coughing more comfortable. It’s important to clear the phlegm off your chest after the operation to prevent a chest infection.

Rest
- Although you should get up and move around as soon as possible, it’s also important that you rest when you are feeling tired.
Exercises to improve your circulation
These exercises will improve the circulation in your legs and are important to reduce the risk of blood clots. Try and do these exercises three times a day, when you are in bed or sitting on a chair.

Brace your knees
- Lie on the bed with your legs straight or if you are sat in a chair slowly straighten one leg.
- Brace your knee by pushing the back of your knee down and into the bed.
- Keeping your leg straight, draw your foot towards you and hold for five seconds.
- Repeat five times on each side.

Knee bend and straighten
- Sitting on a chair or in bed, bend and straighten your leg ten times on each side.

Ankle circles
- Move your foot in a circle, repeating ten times with each foot. Make sure your heels are free from rubbing on the sheet.

Bottom squeezes
- Squeeze the muscles in your bottom and hold for five seconds and repeat five times.

Marching on the spot
- Sit on a chair and march on the spot with your feet ten times.

Knee rolling
- Tighten your tummy muscles by gently pulling your tummy button into your back, breathing normally. With your knees bent and your feet resting on the bed, gently roll your knees to one side as far as is comfortable. Repeat on the other side. This exercise can help with trapped wind.

Further advice
If you need any further information about your surgery or anything covered in the booklet, you can contact the vascular nurse specialists by telephone between 9am and 5pm on 023 8120 6039.

Follow-up
Approximately one week after you are discharged following your surgery, a vascular nurse specialist will contact you by telephone to monitor your progress.

You will be sent an outpatient follow-up appointment with your surgeon to be reviewed in clinic six to eight weeks following your surgery.

If you have any non-urgent questions before this appointment you can contact:
Vascular nurse specialists by telephone on: 023 8120 6039 between 9am and 5pm.

For urgent advice, medical concerns or emergencies please contact your GP or emergency services in the usual way.
My notes
Use this space to record anything you wish to make a note of, such as questions you would like to ask your healthcare professional next time you meet.
If you need a translation of this document, an interpreter or a version in large print, Braille or on audiotape, please telephone 023 8120 4688 for help.