Royal College of Anaesthetists

Vascular Anaesthesia Society of Great Britain & Ireland

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Patient Information Forum

Your anaesthetic for vascular surgery

This leaflet gives information to help you prepare for surgery on one of the large blood vessels in your body. This could be your neck, your abdomen (tummy) or your legs. It provides information about the different types of anaesthetic that can be used for these operations and what choices you may have.

Please ask your surgeon, anaesthetist or preassessment nurse to highlight which sections of this leaflet apply to you. It may also be useful to read the RCoA leaflets on the different types of anaesthetics once you know the type of surgery and anaesthetic that you are going to have. More information here: rcoa.ac.uk/patientinfo/you-your-anaesthetic.

Contents

This leaflet explains:

Preparing for surgery

Getting fitter for the operation

Fitter patients and those who are able to improve their health and lifestyle recover from surgery more quickly and with fewer complications.

There is much you can do to prepare yourself for an operation. Even small changes can make a big difference.

- You might want to increase your levels of physical activity and improve your diet.
- If you drink or smoke, you should consider cutting back or even stopping.
- If you have a long-standing medical problem, check with your GP surgery whether there is anything that you can do to improve it well ahead of the surgery.

Our **Fitter Better Sooner** resources will provide you with the information that you need to become fitter and better prepared for your operation. Please see our website for more information: rcoa.ac.uk/patientinfo/fitterbettersooner.

Your healthcare team will be able to let you know about help available locally.

Anaesthetic preoperative assessment

As part of getting you ready for your vascular surgery, your surgeon will ask you to attend a preoperative assessment clinic (preassessment clinic) at the hospital. A preassessment nurse will assess your medical fitness for the surgical options that are being considered. You may also meet an anaesthetist at this clinic.

This appointment will include looking in detail at any existing medical conditions that you might have such as heart disease, breathing problems (for example, asthma or chronic bronchitis), diabetes, high blood pressure or kidney disease. Many of these conditions can affect recovery from surgery and need to be controlled as well as possible ahead of your surgery.

Although anaemia (iron deficiency) is common, it is associated with worse outcomes after major surgery. You will be tested for anaemia at your preoperative assessment. If you are anaemic before surgery and time allows, the cause of your anaemia will be investigated and treated.

If relevant, a doctor who specialises in the care of elderly people may be asked to assess your overall physical and mental wellbeing. This will also help the healthcare staff looking after you to make sure that the right care and support are available for you after you leave hospital.

Some vascular operations can stress your heart. People with vascular disease are also at higher risk of having heart disease. Therefore, it is important to assess how your heart functions ahead of surgery with a heart tracing test (an electrocardiogram or ECG – see 'Equipment and monitoring used during vascular surgery').

You may be referred to a heart specialist, who may adjust your medication or request some additional tests (see below).

Any new medication will usually be for life and your GP will be informed. This should also have the benefit of protecting your heart long after the operation.

Additional tests of overall fitness

Depending on the type of surgery planned and your medical fitness, you may also be asked to have one or more of the following tests.

Cardiopulmonary exercise testing (CPET)

This test may be done if you are preparing for an aortic aneurysm repair (see next section) or for other procedures if you have suspected heart or lung problems. You will be asked to cycle on an exercise bicycle for approximately 10 minutes. The test shows how your heart, lungs and blood circulation respond to exercise. This helps the healthcare team to identify the most suitable procedure for you and whether you will need extra support during the operation and immediately afterwards. For example, they might suggest that, after the operation, you may need to spend some time in the high dependency unit (HDU) or the intensive care unit (ICU),

where you can be monitored more closely. More information on staying in the HDU and ICU after an operation can be found in our leaflet **Your anaesthetic for major surgery**: rcoa.ac.uk/patientinfo/major-surgery.

Cardiac magnetic resonance imaging (MRI)

This is used to check the blood supply to your heart and how well the muscle and valves work. During the test you will lie still on a bed, which moves inside an open tunnel-shaped scanner. The scan may last over an hour and can be quite noisy, but you will be able to listen to music with headphones and speak with the radiographer during the scan.

Heart 'stress' tests using medicines (dobutamine stress echo or myocardial perfusion scans)

These give more information on the blood supply to your heart and how well the heart pumps when under stress. As they do not involve exercise, they are suitable for patients with limited mobility.

During these tests a medicine is injected into a vein to put the heart under a controlled amount of stress. A scanning machine is used to see how the heart responds. A member of your healthcare team will be with you at all times.

Breathing tests (pulmonary function tests)

These test your maximum breathing efforts by getting you to blow as hard as you can into a small tube. If you have a lung disease and are being treated, it may be used to assess how well your lungs are working. It may also help to diagnose chronic obstructive pulmonary disease (COPD), a progressive lung disease that is common in patients requiring vascular surgery, especially in those who smoke or have smoked heavily.

On the day of the operation

A nurse or anaesthetist will let you know exactly when you need to stop eating and drinking before your operation. Usually, you will be able to eat up to six hours and drink water up to two hours before the operation, or less in some cases.

Once you have been admitted for your operation you will meet your anaesthetist, surgeon and healthcare team. You will be taken to the operating theatre where final checks will be carried out. You will be attached to monitoring equipment. Vascular operations usually require more invasive monitoring such as an arterial line (see 'Equipment and monitoring used during vascular surgery').

Anaesthesia for common vascular operations

In the following sections you will find information about the most common vascular surgery procedures and the types of anaesthetic used. Not all the information will be relevant to you, so and you can ask your healthcare team to tell you which parts you should read.

Carotid endarterectomy (carotid artery)

This surgery is performed to remove the build-up of fatty deposits (plaque) in the carotid artery in your neck, which carries blood to your brain. If the flow of blood is reduced by plaque it can lead to a stroke or a mini-stroke (a transient ischaemic attack or TIA). Carotid endarterectomies can be performed using either a general anaesthetic or a local anaesthetic.

Your anaesthetist will be able to explain more about the advantages and disadvantages of a local or general anaesthetic. They will agree with you and your surgeon which option is better for your surgery based on the condition of your carotid artery, your medical assessment and your preferences.

With a local anaesthetic, you will be awake during the procedure. This has the advantage that the healthcare team can talk to you and ask you to do simple tasks during the procedure, such as squeezing a hand or wriggling your toes. This way they can instantly know whether there are any problems with blood flowing to your head and neck.

An ultrasound machine is used to guide the injection of local anaesthetic into your neck to numb the nerves that supply the area. You may also be offered light sedation to help you relax during the procedure. The surgery normally lasts between one and a half and three hours.

It is normal to feel some pressure once the procedure starts, but, if you feel discomfort during the surgery, you should tell your surgeon and they can give you extra local anaesthetic.

Rarely, some patients may need to be offered a general anaesthetic in addition to local anaesthetic. In this case, the operation will be stopped temporarily to give the general anaesthetic. With a general anaesthetic the anaesthetist may check the flow of blood to your head with a special monitor.

Recovery after a carotid endarterectomy

After carotid surgery you will usually go to either the recovery area or an HDU so that you can be carefully monitored for a few hours. When the anaesthetist and surgeon are happy that your blood pressure is stable, and that you have recovered from the anaesthetic and are feeling comfortable, you will be able to go to the ward.

Aortic aneurysm repair surgery (aorta)

An abdominal aortic aneurysm (AAA) is a bulge or swelling in the aorta, the main blood vessel that runs from the heart down through your abdomen (tummy) and to your legs. It can get bigger over time, which can lead it to burst and cause life-threatening internal bleeding.

There are two main types of surgery for an abdominal aortic aneurysm:

- **Open aortic aneurysm repair (open AAA):** the abdomen is cut and the damaged aorta is replaced with an artificial tube graft.
- **Endovascular aortic aneurysm repair (EVAR):** this is a keyhole operation where a stent (a short wire-mesh tube) is passed through an artery in your groin to strengthen the lining of your aorta.

There are benefits and risks with both types of surgery. These will be discussed with you, taking into account the severity of your arterial damage and your preoperative assessment test results.

Open AAA repair

A general anaesthetic is always needed for an open AAA. You will require extra monitoring such as an arterial line and possibly a central venous catheter (see 'Equipment and monitoring used during vascular surgery'). For pain relief you may be offered an epidural or wound catheters (see Pain relief after surgery).

Afterwards, you will usually go to the ICU or the HDU. Here, your nurse and medical team will make sure that you have enough fluids, your heart, lungs and kidneys are working well and you are comfortable. If all is well, you will usually go back to the surgical ward after one or two days.

EVAR

If your EVAR surgery is thought to be technically straightforward, it is likely to be done under local anaesthetic, which will be injected into the skin in your groin to numb the area where the stents will be inserted. Sometimes other regional anaesthetic techniques (spinals: rcoa.ac.uk/patientinfo/your-spinal-anaesthetic and epidurals: rcoa.ac.uk/patientinfo/epidural-anaesthesia) can be used. You will be required to lie flat for one to two hours. You will be awake and may be offered sedation to help you relax.

If your EVAR surgery is thought to be complex or prolonged, you may require a general anaesthetic. In certain cases you may require a spinal drain (see 'Equipment and monitoring used during vascular surgery' below).

Most patients who have had a standard EVAR procedure normally recover on the surgical ward. Patients who have had a more complex EVAR procedure may be looked after in the HDU or ICU immediately after the operation.

Arterial bypass surgery in your legs (femoral artery)

This type of surgery is used to improve the flow of blood through the arteries of the legs in patients suffering from peripheral arterial disease (PAD). This is known as 'revascularisation'.

There are two main types of revascularisation treatment for PAD:

- Angioplasty: where a blocked or narrowed part of the artery is widened by inflating a tiny balloon placed inside it.
- Artery bypass graft: where a blocked artery is bypassed using either one of your own blood vessels (usually a vein) or an artificial graft.

Your anaesthetic for vascular surgery

These procedures can be carried out using either a general anaesthetic or a regional anaesthetic technique (spinal: rcoa.ac.uk/patientinfo/your-spinal-anaesthetic or epidural: rcoa.ac.uk/patientinfo/epidural-anaesthesia)

Local anaesthetic may also be injected to numb the nerves supplying parts of your leg. This is known as a nerve block. More information can be found at: rcoa.ac.uk/patientinfo/peripheral-nerve-blocks. This provides good pain relief for up to 12 hours and can reduce the amount of stronger pain-killers that you require after the operation.

Which technique is best for you will be decided after discussions among yourself, your anaesthetist and your surgeon, taking into consideration your medical history and fitness.

Lower limb operations can take a long time and you may need to lie flat on your back for several hours. If you are unable to lie flat for long, then a general anaesthetic may be the better option. If a regional technique is used, then sedation can be used to help you relax during the procedure.

After surgery, you will go to a special recovery area where you can be closely monitored. The nurses will be checking that the blood is flowing well to the feet and legs. You will then go back to a surgical ward unless you require extra monitoring, in which case you may go to an HDU.

Equipment and monitoring used during vascular surgery

During vascular surgery your heart and breathing must be monitored carefully. Below are some of the most common monitors and equipment that most patients will experience:

- **ECG (electrocardiogram):** a trace of the electrical activity of your heart. Sticky pads with wires attached are put on your chest.
- **Blood pressure cuff:** monitors your blood pressure by squeezing your arm every three to five minutes throughout the operation.
- **Oxygen saturation monitor:** a small peg or clip put on your finger, toe or earlobe that measures the oxygen levels in your blood.
- **Intravenous cannula (IV line):** a small plastic tube (cannula) inserted in the back of your hand to deliver the drugs and fluids that you will need during the operation.
- **Arterial line:** similar to an IV line but inserted under local anaesthetic into an artery, usually in the wrist where you can feel the pulse. This is used to continuously monitor your blood pressure in real time. It can also be used to take blood samples for testing.

Once you are anaesthetised, the following equipment may also be used depending on which surgery you are having and your medical condition:

- **Breathing tube:** only for a general anaesthetic. This is put in through your mouth into your trachea (windpipe) to help your breathing during the operation. It is put in once you are anaesthetised and removed on waking. More information can be found in our leaflet **Your airway and breathing during anaesthesia** here: rcoa.ac.uk/patientinfo/your-airway.
- **Central venous catheter (CVC):** a larger IV cannula that is put into one of your neck veins. It allows the anaesthetist to give many different drugs and fluids at the same time. Occasionally, this is put in while you are awake, but your anaesthetist will inject some local anaesthetic to numb the skin and minimise any discomfort. The CVC can often be kept in for a day or more after your surgery if you need it.
- **Ultrasound:** if you require a regional anaesthetic or a nerve block the anaesthetist may use an ultrasound machine to help them give the injection in the right place.
- **Transoesophageal echocardiogram (TOE)**: once you are asleep with a general anaesthetic the anaesthetist may put an ultrasound tube (transoesophageal echocardiogram or TOE) through your mouth down towards the stomach to give pictures of your heart during the operation. This will be taken out before you wake up.
- **Urinary catheter:** a tube inserted into your bladder to collect urine. You may be awake when this is put in, but local anaesthetic gel will be used to minimise discomfort.
- **Lumbar drain:** this is a small flexible tube that is placed in the lower spine to drain some of the fluid surrounding your spinal cord and brain to protect them from injury. This can also improve the blood flow to your spinal cord after complex aortic aneurysm repairs where a very long section of the aorta is affected. If you need this, your anaesthetist and surgeon will discuss it in more detail with you.

Cell salvage machine and blood transfusion

Blood transfusion may be needed in all major surgery, but donated blood will be given only if absolutely necessary. Blood transfusion is most common in those undergoing lower limb and aortic surgery. Whenever possible, a cell salvage machine will be used; this collects your own blood, washes it and then returns it to you, avoiding the need for transfusions.

Pain relief after surgery

Some people need more pain relief than others or respond differently to pain-relieving drugs. Occasionally, pain is a warning sign that all is not well, so you should tell the staff looking after you if your pain increases.

Your anaesthetist will discuss different options with you to help manage your pain after surgery.

You will normally be given regular pain relief by mouth or into your IV line. For surgery on your aorta or blood supply to your legs, your anaesthetist may also discuss with you the following options.

Continuous epidural

If you have an epidural, the epidural catheter will be left in place at the end of the operation and connected to a pump to inject anaesthetic and pain-killers as required after surgery. You may have some numbness over your abdomen and legs, and your limbs may feel heavier than normal until the pump is stopped. The epidural can stay in for several days after the operation.

Patient-controlled analgesia (PCA)

This is a pain relief pump connected to your cannula, which you control yourself by pressing a button. The pump has safety settings to stop you accidentally getting too much medication.

Wound catheters

Local anaesthetic is injected into your wound along one or more small plastic tubes to numb the area of the surgery. The surgeon or anaesthetist will place the tubes during the operation. Wound catheters can stay in for several days after your operation.

Nerve blocks

Local anaesthetic is injected around nerves that supply parts of the surgical site. An ultrasound machine is used to locate the nerves and ensure that the local anaesthetic is injected safely. This may be done when you are awake or asleep depending on the surgery.

Risk and shared decision-making

Modern anaesthetics are very safe. There are some common side effects from the anaesthetic drugs or the equipment used, which are usually not serious or long lasting. Risks will vary between individuals and will depend on the procedure and anaesthetic technique used.

There are some specific risks associated with anaesthetics for vascular surgery, including bleeding, infection and damage to the heart and kidneys.

Your anaesthetist will discuss with you the risks that they believe to be more significant for you and how these can be reduced. They will only discuss less common risks if they are relevant to you.

You can read more detail about risks associated with anaesthesia here: rcoa.ac.uk/patientinfo/risk-leaflets.

Shared decision-making

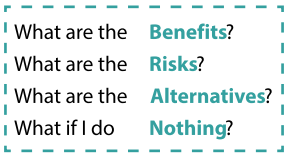
Shared decision-making ensures that individuals are supported to make decisions that are right for them. It is a collaborative process through which a clinician supports a patient to reach a decision about their treatment.

The conversation brings together:

- the clinician's expertise, such as treatment options, evidence, risks and benefits
- what the patient knows best: their preferences, personal circumstances, goals, values and beliefs.

Find out more at: england.nhs.uk/personalisedcare/shared-decision-making.

Here are some tools that you can use to make the most of your discussions with your anaesthetist or preoperative assessment staff:



Choosing Wisely UK BRAN framework

Use this as a reminder to ask questions about treatment.
https://bit.ly/CWUK_leaflet

NHS ask three questions

There may be choices to make about your healthcare.
https://bit.ly/NHS_A3Qs

The Centre for Perioperative Care (CPOC)

CPOC has produced an animation to explain shared decision-making.
cpoc.org.uk/shared-decision-making

Questions ?
you might like to ask

If you have questions about your anaesthetic, write them down (you can use the examples below and add your own in the space below them). If you want to speak to an anaesthetist before the day of your operation, contact the preoperative assessment team, who may be able to arrange for you to speak to an anaesthetist on the phone or to see them in a clinic.

1. **What type of anaesthetic is recommended for my vascular surgery?**
2. **Do I have any special risks?**
3. **Which type of pain relief do you think is best for me?**
4. **Will I need to stay in the HDU or the ICU?**
5. **How long will my recovery take?**
6. ...
7. ...

Where can I get further information?

Most hospitals produce their own information leaflets about vascular and heart surgery and many of these contain information about anaesthesia.

Some of the leaflets below may also be available from the anaesthetic department or preassessment clinic in your hospital.

Additional sources of information

- RCoA anaesthesia and risk webpages (rcoa.ac.uk/patientinfo/risk-leaflets).
- RCoA Fitter Better Sooner leaflet (rcoa.ac.uk/patientinfo/fitterbettersooner).
- RCoA information leaflets and video resources (rcoa.ac.uk/patientinfo/leaflets-video-resources).
- Vascular Society for Great Britain and Ireland (vasgbi.com).
- Royal College of Surgeons of England (http://bit.ly/2LNAY52).
- NHS Choices (nhs.uk).
- Your GP.

Disclaimer

We try very hard to keep the information in this leaflet accurate and up-to-date, but we cannot guarantee this. We don't expect this general information to cover all the questions you might have or to deal with everything that might be important to you. You should discuss your choices and any worries you have with your medical team, using this leaflet as a guide. This leaflet on its own should not be treated as advice. It cannot be used for any commercial or business purpose. For full details, please see our website: rcoa.ac.uk/patientinfo/resources#disclaimer

Information for healthcare professionals on printing this leaflet

Please consider the visual impairments of patients when printing or photocopying this leaflet. Photocopies of photocopies are discouraged because these tend to be low-quality prints and can be very difficult for patients to read. Please also make sure that you use the latest version of this leaflet, which is available on the RCoA website: rcoa.ac.uk/patientinfo/leaflets-video-resources

Tell us what you think

We welcome suggestions to improve this leaflet. Please complete this short survey: surveymonkey.co.uk/r/testmain or scan the QR code with your mobile.

If you have any general comments, please email them to: patientinformation@rcoa.ac.uk.

Royal College of Anaesthetists
Churchill House, 35 Red Lion Square, London WC1R 4SG
020 7092 1500

rcoa.ac.uk

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Translations available for this leaflet online rcoa.ac.uk/patientinfo/translations