Service: Vascular

Treatment of abdominal aortic aneurysm (AAA)
What is an abdominal aortic aneurysm?

The aorta is the largest artery in the body. It carries blood from the heart through the chest and abdomen (tummy). At around the level of the belly button the aorta divides into two iliac arteries carrying blood to each leg.

An aneurysm develops when the wall of a blood vessel becomes less elastic and starts to ‘balloon’. This makes the wall weaker and at risk of bursting (rupture).

Aneurysms can occur in any artery. They most commonly occur in the aorta in the abdomen, known as abdominal aortic aneurysm (AAA).

What should I be concerned about?

The major concern is that an aneurysm can burst (rupture). This happens because the wall of an aneurysm is weaker than that of a normal healthy artery.

If an aneurysm bursts this causes internal bleeding. This is usually a sudden event, with little or no warning, and one that most people do not survive.

How does having an AAA affect my life?

We advise maintaining a low blood pressure and no heavy lifting or high-intensity exercise, otherwise you can continue your life as normal. If you do have a heavy manual job, please discuss any concerns you might have with your surgeon.

You can still drive, unless you are given instruction by your consultant not to, for instance if your aneurysm is very large (≥ 6.5 cm in maximum diameter), or you are a HGV driver. If you drive, you must inform the DVLA:

https://www.gov.uk/aneurysm-and-driving

If you develop severe chest or back pain, then you should call 999 to be taken to your nearest Emergency Department for assessment.
What is the risk of AAA rupture?

The risk of rupture increases with aneurysm size (page 8). It is usually **above a diameter of 5.5cm** that the benefits and risks of intervention as a planned procedure are considered. Intervention may be considered for a smaller size if you are female, have Marfan syndrome (or another connective tissue disorder).

For any given size, the risk of the AAA rupturing is greater in:

- Women
- People who smoke
- People with a family history of aortic aneurysm/dissection
- People with uncontrolled high blood pressure
- People with chronic chest problems (COPD)

Should everyone with an AAA have surgery?

The short answer is no as each person’s risk of rupture and risk of complications from surgery is different. The decision of whether to choose to undergo surgery is a balance of factors important to you. One in four people after discussing treatment options with their surgeon choose to ‘do nothing’ for their aneurysm, as the treatment risk exceeds the benefit.

Screening of family members

**Developing an AAA is ‘inherited’ in 10% of people.**

If you are male and have brothers or male children, you should ask your vascular specialist about the age at which they should have ultrasound scans to check if they too have an AAA. If you are female, then this advice applies to all siblings and all children (as AAA is less common in women).

Occasionally, genetic testing is performed:

https://www.nhs.uk/conditions/genetic-and-genomic-testing/
Will I need special tests?

The type of AAA repair, and the risks associated with that repair, depends largely on the shape of your aorta. Most important is the relationship between your aneurysm and branches that supply your liver, intestines, kidneys, pelvis and legs.

**Your aneurysm is evaluated using a CT scan.**

The CT scan to the right shows an abdominal aortic aneurysm (AAA) below the arteries to the kidneys but involving the artery to the right leg (an ‘iliac aneurysm’).

**This aneurysm can be treated by either open surgery or an aortic stent graft (EVAR).**

You will also have assessments of your fitness:

- Consultation with a doctor with a specialist interest in medicine of the elderly and frail, known as a complex care assessment (CCA)
- Stationary bike test, cardiopulmonary exercise test (CPET)
- Pre-operative assessment clinic appointment (POAC)

More information on preparation for aortic surgery can be found in the patient information leaflet ‘Coming in for your aortic surgery’.
Your treatment options

Open surgical repair

Open surgical repair involves opening your abdomen (a ‘laparotomy’) to repair the aneurysm by sewing in an artificial piece of artery (graft), as shown to the right.

This is major surgery and requires your surgeon to stop the blood flowing in the aorta and down to your legs with clamps for a period whilst the graft is stitched into place.

**Your vascular specialist may recommend that the risks of open surgery for you are too high.** This recommendation will depend on factors including your age, health and the shape of your aneurysm.

If you have an aneurysm which extends above or around the arteries to your kidneys, or an aneurysm that involves the arteries going to the legs, the surgery will be more difficult. **This means the risk of death or a major complication will be higher.**

Some aortic aneurysms extend up into the chest. Open surgical repair requires the surgeon to interrupt the blood supply to the liver, gut and kidneys. Sometimes, heart bypass is used to carry blood to these organs during the surgery. **For such aneurysms risk of dying is as high as 1 in 5 (20%).**

Please read our ‘Open repair for AAA’ leaflet for more details.
Aortic stent graft

A stent graft consists of synthetic fabric tubes (the ‘graft’) mounted onto metal skeletons (the ‘stents’).

The stent graft comes loaded into a delivery system. The delivery system, of similar width to a large pen, is small enough to be inserted through the arteries in your groins through two small incisions.

The stent graft components are positioned using x-rays. The delivery systems are then removed and the small incisions in the groin closed.

The aim of the stent graft is to allow blood to only flow through the stent graft tubes and not into the bulging sac of the aneurysm. The sac is no longer under pressure and should shrink with time. In this way we ‘exclude’ the AAA and reduce the risk of it rupturing.

Please read our ‘Standard Stent Graft (EVAR) for AAA’ leaflet for more details.
In some people, the shape of their AAA is such there is insufficient healthy aorta below the arteries to the kidneys, or in one or both common iliac arteries, for a standard stent graft to fix in place. To treat these aneurysms, it is often possible to use a ‘complex’ stent graft, often **custom-made** to fit an individual patient.

Instead of being a ‘tube’, custom stent grafts are made with holes (fenestrations) or branches, in the positions that arteries come off the aorta and/or for the internal iliac arteries. These maintain blood supply to vital organs, or the pelvis, whilst excluding the aneurysm sac from blood flow.

The stent graft is completed with components as for a standard endovascular repair.

This means that these ‘complex’ stent grafts can be safely extended up into the thoracic aorta or down into the external iliac arteries.

**Complex aortic stent grafts** carry higher risks than standard EVAR. There is also a higher risk of needing further procedures. However, complex stent grafts are significantly safer than open surgery when a clamp must be placed above the arteries to the liver and gut.

Please read our ‘Complex Aortic Stent Grafts’ leaflet for more details.
Do nothing (medical management)

Some people decide that they do not want aortic surgery. ‘Doing nothing’ means you and your vascular surgeon together decide that the best option for your aneurysm is to leave it untreated as the risks of treatment outweigh the benefits and there is no expectation that this will change over time, meaning that there is no benefit from ‘watch and wait/higher threshold’ (below).

The main factor determining the risk of AAA rupture is its size. For aneurysms measuring 5.0 - 5.5cm in diameter the risk of rupture in men is 0.5% each year. The risk of rupture is slightly higher for any given size of aneurysm in women.

As aneurysms grow in size so does the risk of rupture. The diameter at which AAA rupture most commonly occurs is 8cm.

An example of when you and your specialist might agree ‘doing nothing’ is the better choice is when the risk of death after surgery is higher than the risk that your aneurysm will rupture. It may also be best to avoid surgery if you have other significant health problems.

‘Watch and wait’/‘higher threshold’

Most people look into surgery when their AAA is above 5.5cm in diameter. Sometimes the patient and specialist agree not to operate, but to ‘watch and wait’ and re-assess the benefits and risks again when the AAA gets bigger. For complex AAA repair, it is usual to set a ‘higher threshold’ of 6.0cm for repair.

The decision to ‘do nothing’ or ‘watch and wait’ is best discussed with your GP and family so that a plan can be put in place for you in case your aneurysm does rupture.
How do I decide which option is best for me?

Consider the benefits and risks of each option

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<tr>
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<th>Benefits</th>
<th>Risks</th>
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<tr>
<td><strong>Open surgery</strong></td>
<td>- Lower risk of further procedures</td>
<td>- Higher risk of early death and complications</td>
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<td></td>
<td>- Preferred in Marfan’s syndrome</td>
<td>- Longer hospital stay</td>
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<td>- Slower recovery</td>
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<td>- Risk of wound problems</td>
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<tr>
<td><strong>EVAR</strong></td>
<td>- Lower risk of death and complications</td>
<td>- 1/5 risk of further procedure to keep AAA fixed</td>
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<td>- Shorter hospital stay</td>
<td>- AAA could still rupture (less than 1% chance per year)</td>
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<td></td>
<td>- Shorter recovery time</td>
<td>- Risk of groin problems</td>
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<tr>
<td><strong>Complex EVAR</strong></td>
<td>- Intermediate risk of death and complications</td>
<td>- Delay for manufacture</td>
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<td>- Intermediate hospital stay</td>
<td>- 1/4 risk of further procedure to keep AAA fixed</td>
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<td></td>
<td>- Faster recovery</td>
<td>- AAA could still rupture (less than 1% chance per year)</td>
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<td>- Risk of groin problems</td>
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<tr>
<td><strong>Watch and wait</strong></td>
<td>- Defers the risks of getting complications from surgery</td>
<td>- 6.0cm AAA has a 5% chance of rupture per year</td>
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<td>- The risk increases as the aneurysm grows</td>
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<tr>
<td><strong>Do nothing</strong></td>
<td>- No risk of getting complications from surgery</td>
<td>- 6.0cm AAA has a 5% chance of rupture per year</td>
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<tr>
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<td>- The risk increases as the aneurysm grows</td>
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There are inevitably pros and cons to each choice. It is a good idea to think about what is most important to you. Your vascular specialist and the wider team may also have a strong recommendation. However, we always want to come to a shared decision over for the best treatment choice for you.
Examples of balancing the benefits and risks

Shared decision in favour of ‘do nothing’

A man aged 75 years old who has a 5.5cm AAA: only open surgery, or a complex stent graft, are suitable. He gets daily chest pain (angina) and has had a recent stroke. He is at very high risk of major complications. He is also more likely to have a reduced life expectancy due to his heart problems.

- Higher risk of death or complications
- Recent stroke
- Chest pains

Risk of rupture

AAA is 5.5cm so 5% risk of rupture per year

Shared decision in favour of choosing surgery

Now, let us take a 67-year-old man who has a 6.5cm AAA, 2 years after a successful heart bypass operation for angina. This is of a shape best treated by open surgery. He performs well in all of his pre-operative tests.

- Average surgical risk
- Previous heart operation but no problems since

Risk of rupture

AAA is 6.5cm so 10-15% risk of rupture per year

Read more

NHS Choices
www.nhs.uk/conditions/abdominal-aortic-aneurysm-screening/

AAA Screening
www.aaascreening.info/
Ask us questions

We want you to be an active participant in your healthcare. Tell us what is important to you and please ask us questions. Considering the following three questions may be useful. You can also contact us by phone (details on next page).

Healthy Living

Adopting a healthier lifestyle and diet means that if you have AAA surgery you will be in the best possible health, both for the surgery itself and for recovery after:

- Stop smoking
- Reduce alcohol intake
- Exercise more regularly
- Lose weight
- Control high blood pressure
- Take statin medication
How to contact us:

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Vascular clinical nurse specialists:
0117 414 5302/3/4

AAA screening programme:
0117 414 8610

Patient pathway coordinators:
0117 414 0798

www.nbt.nhs.uk/vascularsurgery

If you or the individual you are caring for need support reading this leaflet please ask a member of staff for advice.

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