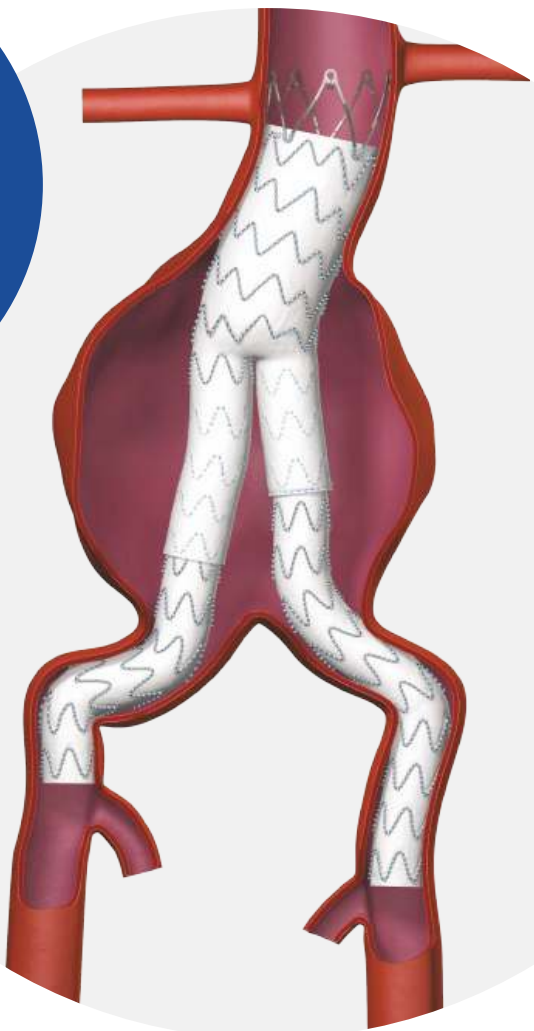


**Medtronic**

**Endovascular  
Stent Grafts:  
A Treatment for  
Abdominal Aortic  
Aneurysms**



Patient Information

Booklet

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# Introduction

You have discussed having a **stent graft** procedure to treat an **abdominal aortic aneurysm (AAA)** with your doctor. Your doctor has given you this guide to help you further understand the device and procedure. Only a doctor can determine if you are a good candidate for an **abdominal stent graft** procedure.

A Glossary is provided in the next section to help you understand the medical terms used in this book. Words that are bolded in the text are defined in the Glossary.

There are two **stent graft** types available: bifurcated and aorto-uni-iliac (AUI). Your physician will determine which **stent graft** is best for you but in general, an **AUI stent graft** is used when a **bifurcated stent graft** cannot be used. This booklet will provide you with more information about the **stent graft** types. Please note that additional procedures may be needed with the use of an **AUI stent graft**, which you should discuss with your doctor.

# Glossary

**Abdominal aortic aneurysm (AAA):** A bulging or “ballooning” of a weakened area of the abdominal aorta. This term is often called “AAA.”

**Anatomy:** The study of parts of the body.

**Aneurysm rupture/Rupture:** A tear in the blood vessel wall near or at the location of the weakened area of the blood vessel.

**Aorta:** The main artery that carries blood from the heart to the rest of the body.

**Aorto-uni-iliac (AUI) stent graft:** A type of stent graft used to treat abdominal aortic aneurysms. This type of stent graft extends from the aorta down to one of the two iliac arteries that supply blood to the legs. Refer to **Figure 5** for illustration of the AUI stent graft.

**Bifurcated stent graft:** A type of stent graft used to treat abdominal aortic aneurysms. This type of stent graft extends from the aorta down to the two iliac arteries that supply blood to the legs. Refer to **Figure 5** for illustration of the bifurcated stent graft.

**Computed Tomography (CT) scan:** A scan that creates a series of X-rays that form a picture of the aneurysm and nearby blood vessels.

**Endoleak:** Blood flow into the aneurysm (bulge or ballooning of the weakened area of the blood vessel) after placement of a stent graft.

**Endovascular:** Inside or within a blood vessel.

**Endovascular stent grafting:** A procedure in which a tube-shaped device is placed inside a diseased vessel without surgically opening the tissue surrounding the diseased vessel.

**Exclude:** Shutting off or removing from the main part.

**Femoral arteries:** Blood vessels that carry blood to the thigh region of each leg. Doctors can use these arteries as pathways to reach the aorta. Refer to

**Figures 4** and **6** for an illustration of the location of the femoral arteries.

**Femoral-femoral artery bypass:** A type of surgery that is performed as part of some endovascular stent graft procedures. A portion of one iliac artery on one side of the patient is intentionally blocked if required and if not already blocked. Blood flow to the leg on this side is preserved by surgically connecting the femoral artery that is below the blocked portion to the femoral artery of the other leg, using a fabric graft. Refer to **Figure 8** for illustration of the femoral-femoral artery bypass.

**Fluoroscopy:** A real-time X-ray image that is viewed on a monitor. This is an imaging technique generally used by doctors to see the placement of the stent graft during endovascular procedures.

Iliac arteries: Blood vessels that carry blood to the lower back, groin, and buttocks. Refer to **Figures 1** and **2** for an illustration of the location of the iliac arteries.

**Imaging:** The use of X-rays, CT scans, MRI scans or other techniques to obtain pictures of the inside of the body.

**Minimally invasive:** Involving a puncture or cut of the skin without exposing the internal organs.

**Magnetic resonance imaging (MRI):** A technique that uses magnetic fields to form images of structures within the body.

**Occlusion device:** Device used during some endovascular procedures to stop or prevent backward flow of blood into an artery.

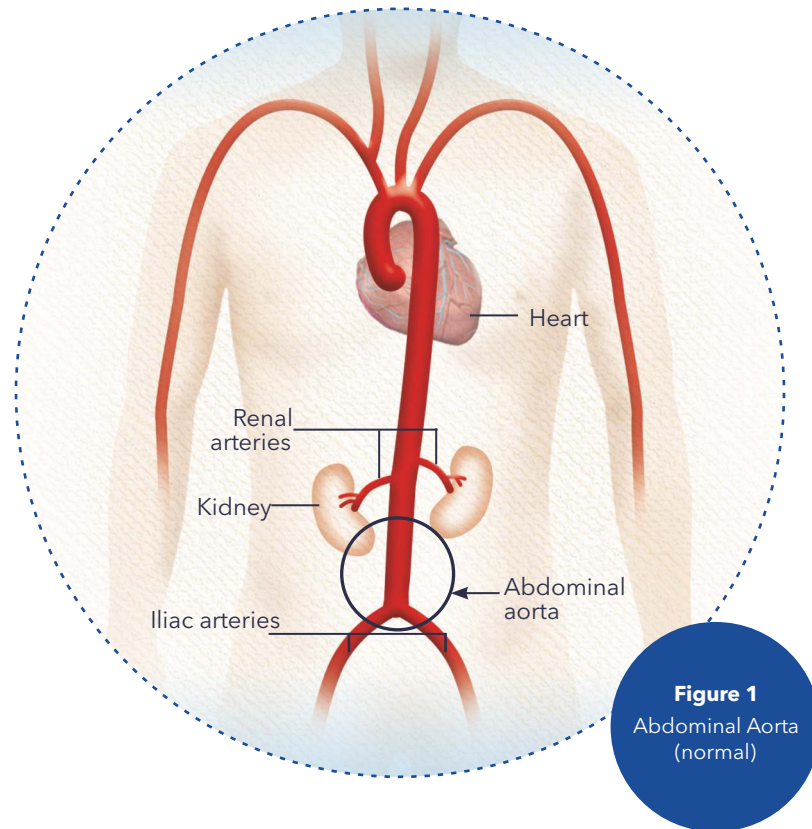
**Open surgery/Open surgical repair:** A type of surgery performed to repair an aneurysm. The doctor repairs the aorta by making a large cut in the abdomen. The weakened area of the aorta is removed and replaced with a fabric graft. The graft is sewn into place and acts as a replacement blood vessel.

**Stent graft/Abdominal stent graft:** A woven polyester tube supported by a tubular metal web that is placed inside of a diseased vessel without surgically opening the surrounding tissue. After being placed in the artery, the stent graft expands and relieves the pressure on the aneurysm by providing a new pathway for blood flow.

**Ultrasound:** An imaging technique that creates an image through the use of high-frequency sound waves.

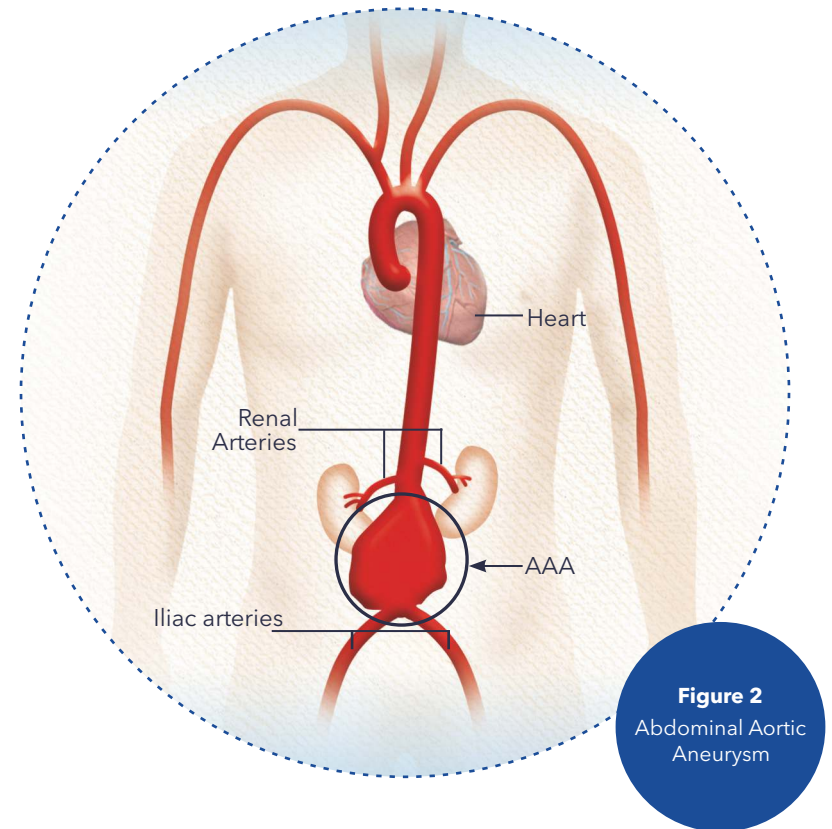
# Abdominal Aorta

The **aorta** is the largest blood vessel in the body. It carries blood away from the heart to the rest of the body. The abdominal **aorta** is the part of the aorta located in the abdomen (see **Figure 1**).



# Abdominal Aortic Aneurysm

An **aneurysm** is the bulging or ballooning of a weakened area of a blood vessel. The wall of the **aorta** can become weak due to age, disease or trauma. This may cause the aortic wall to bulge, leading to an **AAA** (see **Figure 2**). As the bulge grows, the wall of the **aorta** becomes weaker. This may cause the **aorta** to **rupture** and lead to massive internal bleeding. An **aneurysm rupture** can cause death and needs immediate medical attention.



# Causes

The risk of developing an **AAA** increases with age. **AAA** usually affects people over 50 years of age and is more common in men than in women. Other risks include smoking and high blood pressure. A patient with a family history of **AAA**

is at higher risk and should consult a doctor.

# Symptoms

In most cases, patients have no symptoms of an **AAA**. However, for those patients with symptoms, the most common one is pain in the abdomen, back or chest. The pain may range from mild to severe. Some patients might feel the aneurysm as a throbbing mass in their abdomen. An **AAA** is often discovered during an examination being done for other unrelated health reasons. Your doctor may feel a bulge or pulsation (throbbing) in your abdomen. Most often, aneurysms are found during a medical test such as a **CT scan** or **ultrasound**.

# Treatment Options

If your doctor thinks there is a risk that your **AAA** may **rupture**, he/she may recommend treatment. There are two primary treatment options available depending on your doctor's diagnosis:

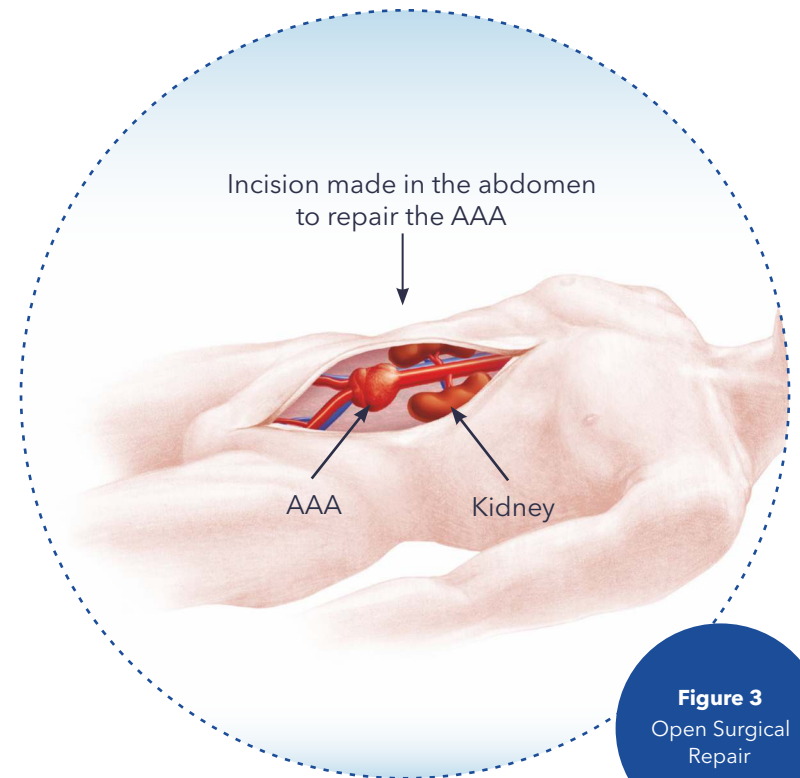
## Open Surgery Or Endovascular Stent Grafting

# Open Surgery

In this treatment option, the doctor repairs the **aorta** by making a large cut in the abdomen (see **Figure 3**). The **aneurysm** section of the **aorta** is removed and replaced with a fabric graft.

The fabric graft is sewn into place and acts as a replacement blood vessel. The blood flow through the aorta is stopped while the graft is put in place.

**Open surgery** is typically performed under general anesthesia. It takes about three to four hours to complete. Patients typically spend one to two days in an intensive care unit and typically remain in the hospital for one week. Patients may require two to three months to recover completely. Open repair is a proven medical procedure.



# Endovascular Stent Grafting

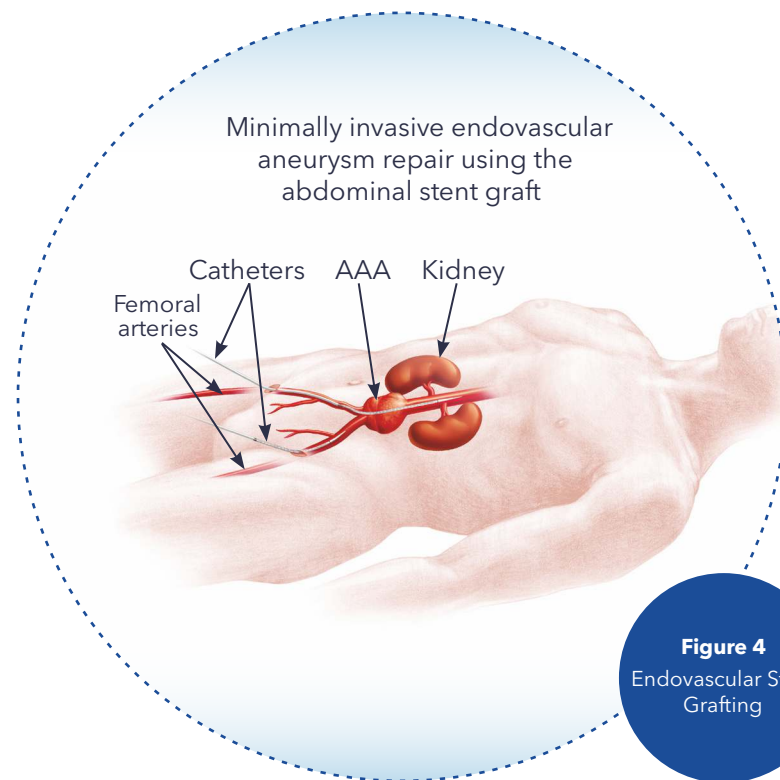
This is a **minimally invasive** procedure. A **stent graft** (such as the **abdominal stent graft**) is placed inside the aneurysm without surgically opening the tissue surrounding it (see **Figure 4**). The **stent graft** is a fabric tube supported by a metal framework. The placement of an **AUI stent graft** may require an additional procedure, such as **femoral-femoral artery bypass** and/or placement of an **occlusion device** in your **iliac artery** (see **Figure 8**).

This procedure is typically performed under local, regional or general anesthesia. It takes about one to three hours to complete. Patients typically spend a few hours in the intensive care unit and typically remain in the hospital for one to two days. Patients may require four to six weeks to recover completely.

The recovery time for a patient who receives an **AUI stent graft** device along with a **femoral-femoral artery bypass** would be different than if you received a **bifurcated stent graft** device because of the additional **femoral-femoral artery bypass** being performed. The typical hospital stay would be approximately 4-7 days for a patient receiving an **AUI stent graft device** and a **femoral-femoral artery bypass**, with the full recovery lasting as long as the bypass incisions take to fully heal which could be about 4-6 weeks.

Your medical history in combination with your arterial **anatomy** may make you a better candidate for an **AUI stent graft** rather than a **bifurcated stent graft** and/or **open surgical repair**.

Risks and benefits are associated with both treatment options. Patients should talk with their doctors about which option is best for them.



**Figure 4**  
Endovascular Stent Grafting

## Abdominal Stent Graft

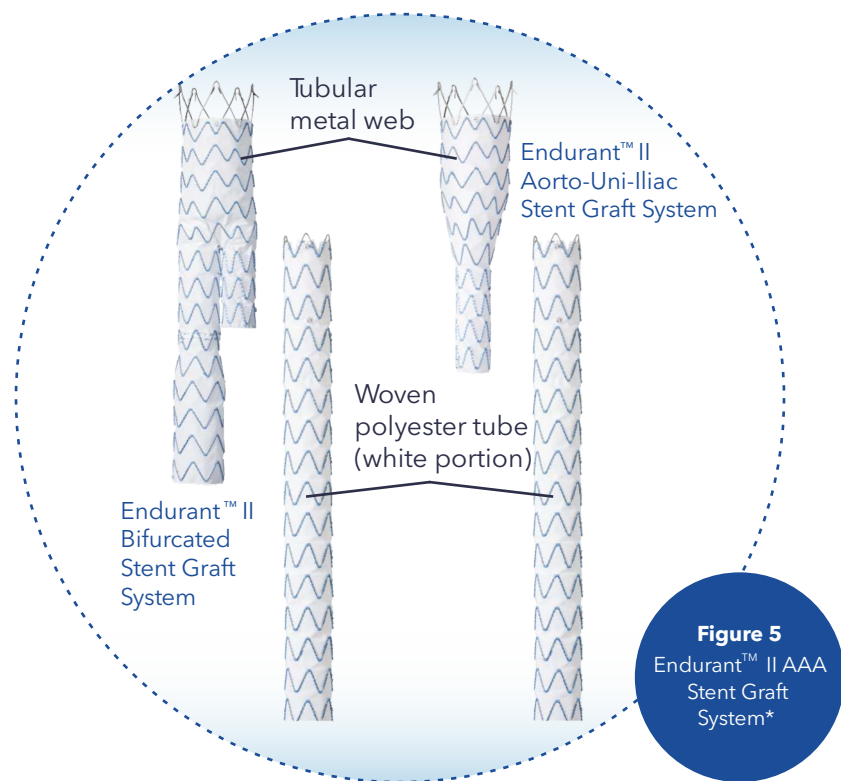
The **abdominal stent graft** is a fabric tube supported by a metal framework (see **Figure 5**). It is placed in the **aorta** using a catheter. The **stent graft** is designed to **exclude** the **aneurysm**. The **stent graft** reduces the pressure on the **aneurysm** and provides a new pathway for blood flow. This reduces the risk of **rupture**.

The **abdominal stent grafts** manufactured by Medtronic are typically made from nitinol (nickel-titanium), polyester and platinum-iridium.

Do not get the **abdominal stent graft** if:

- You have a condition that can infect the **stent graft**
- You are allergic to the **stent graft** materials

There are two **stent graft** types available: **Bifurcated** and **AUI**. Your medical history in combination with your arterial **anatomy** may make you a better candidate for an **AUI stent graft** rather than a **bifurcated stent graft** and/or an **open surgical repair**. Your doctor can help determine if the **abdominal stent graft** is suitable for you.



In some cases, your physician may choose to implant EndoAnchor™ implants at one end of the stent graft to help keep it in place and reduce the potential for **endoleaks**. EndoAnchor™ implants are a series of small metallic coils that hold the **stent graft** to the artery wall to keep the **stent graft** from moving. If this occurs, you can expect the same basic risks and benefits from the treatment and the same precautions and follow-up instructions would apply.

\* NOTE: The stent grafts shown in the figure above are not representative of the actual size. The bifurcated stent grafts manufactured by Medtronic range in length from 124 mm (4.88 in.) to 166 mm (6.54 in).

The aorto-uni-iliac (AUI) stent grafts manufactured by Medtronic have a length of 102 mm (4.02 in).

## Risks

As with any **endovascular stent graft**, the **abdominal stent graft** comes with risks. Please discuss all risks with your doctor. Major risks associated with abdominal **endovascular stent grafts** include, but are not limited to:

- **Endoleaks**– An **endoleak** is the leaking of blood around the graft into the aneurysm. **Endoleaks** can be detected using **CT scans**. Most **endoleaks** do not require treatment. Your doctor can decide if you need any treatment.
- **Stent graft** movement– This is the movement of the **stent graft** from its original position over time. This can be assessed using **imaging** techniques like **CT scans**. Your doctor can decide if you need any treatment.
- Device-related issues (for example, breaking sutures or the metal portion of the **stent graft** or the EndoAnchor™ implant (if used)) – These issues may be detected using **imaging** techniques such as X- rays. Your doctor can decide if you need any treatment.
- **Aneurysm rupture**
- The use of this device requires **fluoroscopy** and use of dyes for **imaging**. Patients with kidney problems may be at risk of kidney failure due to the use of dyes.
- Swelling of the groin area
- Nausea and vomiting
- A hole or a tear of the blood vessels are risks associated with any catheter-based procedure. These risks may increase with the use of large-sized catheters.
- Formation of an abnormal passage between your arteries and veins
- Bowel complications including death of a portion of your bowel tissue requiring surgical removal
- Cramping pain and weakness in the legs and especially the calves
- Formation of blood clots that block the flow of blood to your organs
- Fever and inflammation
- Problems affecting your urinary and reproductive organs including infection and tissue death
- Impotence
- Infection of the aneurysm and device access site

Complications of the nervous system including total or partial paralysis of the lower half of the body with involvement of both legs, confusion, stroke, and transient ischemic attack

- Blockage of the device or blood vessel
- Kidney problems
- Liver problems
- Additional **endovascular** procedures
- Surgical conversion to **open surgical repair**
- Infection, pain or bleeding in wounds
- Reduced blood flow to the legs resulting from complications of the **femoral-femoral artery bypass** or any device used during the **endovascular** procedure
- Death

## Benefits

There are a number of benefits<sup>1</sup> to having an **abdominal stent graft** procedure. Some of these are listed below:

- The procedure is **minimally invasive**.
- The procedure can be performed under local anesthesia.
- There is a lower surgical complication rate.
- The patient may lose less blood during the procedure. This reduces the risk of blood transfusion.
- The patient may spend less time in the intensive care unit after the procedure, and have a short hospital stay.

Based on clinical study data for abdominal stent grafts manufactured by Medtronic. The long-term results of the abdominal stent graft have not yet been established.

# Abdominal Stent Graft Procedure

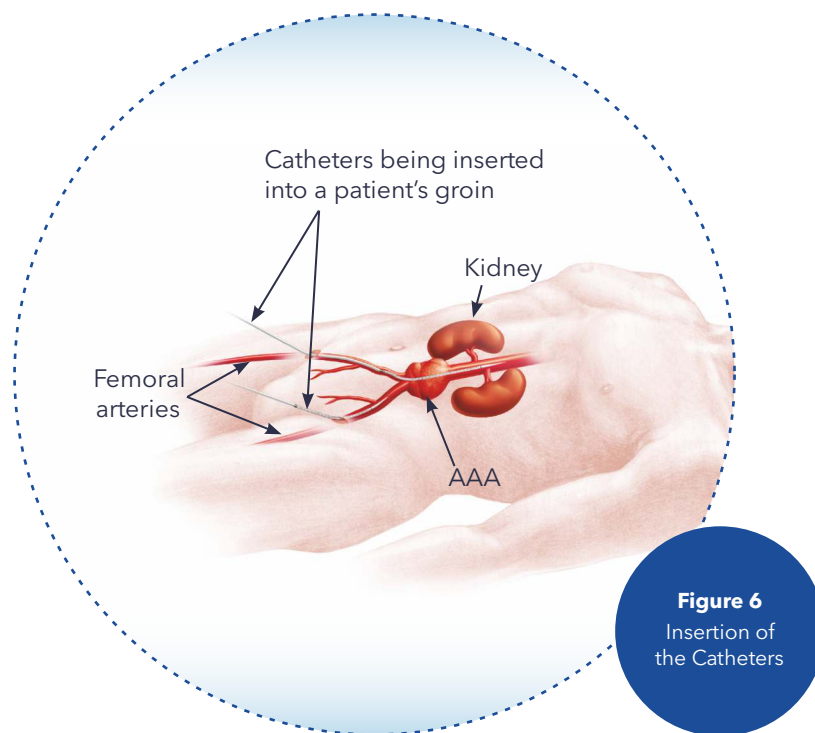
## Before The Procedure:

Prior to the procedure, **imaging** tests like **CT scans** are performed. These tests allow the doctor to assess the **aneurysm**. Your physician will determine which **stent graft** is best for you based on your pre-procedure **imaging**.

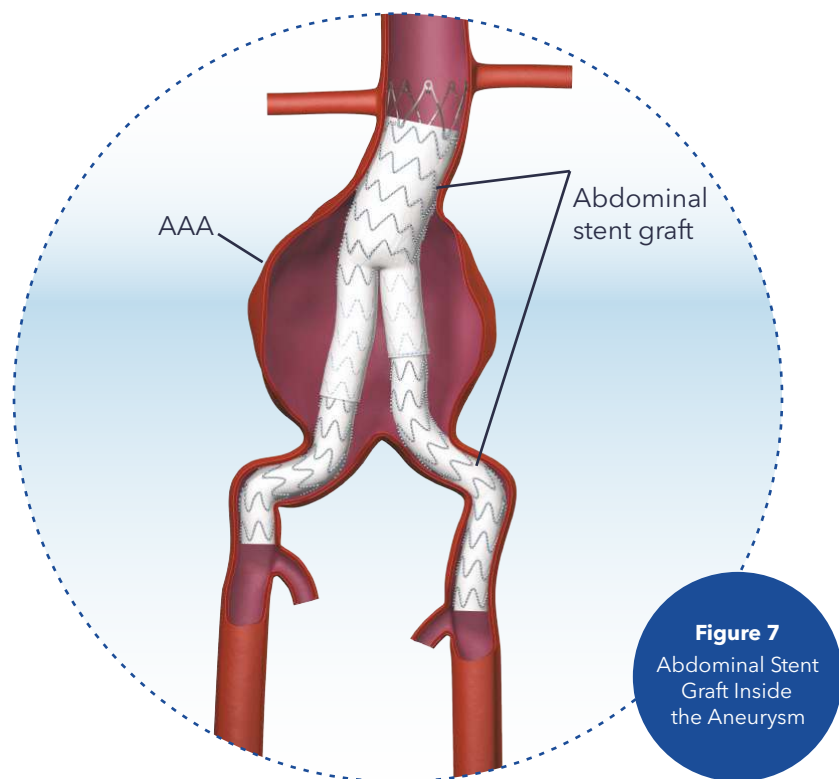
## During The Procedure:

This procedure is performed using anesthesia. A small cut is made on both sides of the groin to prepare for the stent grafting procedure.

**Fluoroscopy** is used to guide the catheter to the **AAA**. The catheter is a long, thin tube-like device used to place the **stent graft** in the **aorta**. The catheter is advanced through the large vessel in the patient's groin (**femoral artery**) to reach the abdominal **aneurysm** (see **Figure 6**).



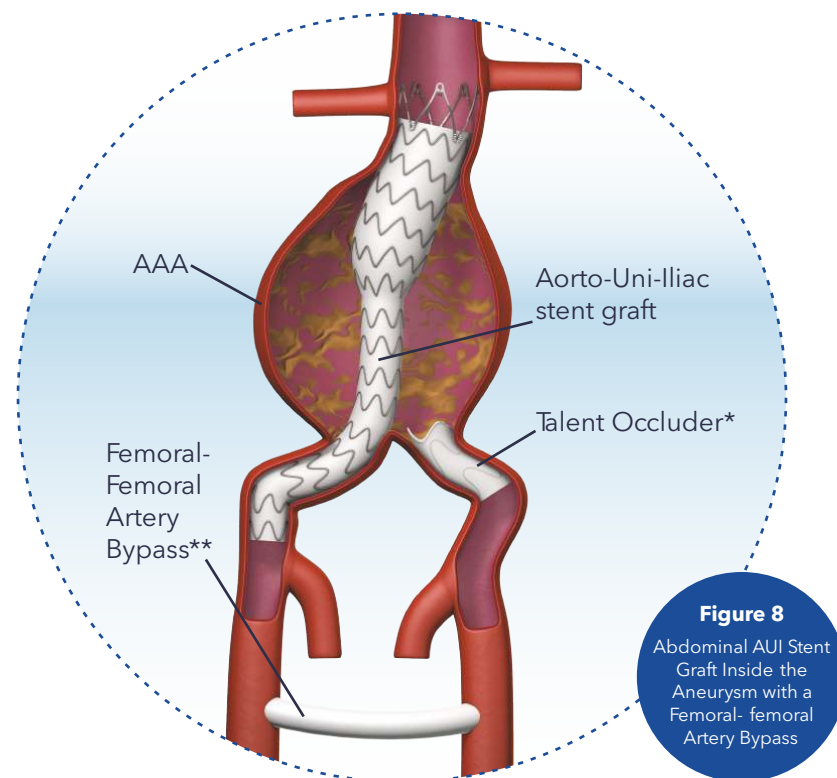
The **stent graft** is slowly released from the catheter into the **aorta**. As the **stent graft** is released, it expands to its proper size so that it snugly fits into the **aorta** both above and below the **aneurysm**. The catheter is then removed from the body. The **stent graft** remains inside the **aorta** permanently (see **Figure 7**). Additional **stent grafts** may be required to completely **exclude** the aneurysm. **Imaging** procedures are often performed to check whether the **stent graft** is properly placed.



In situations where only one iliac artery is available, your doctor may decide to use an **AUI stent graft**. This device may treat the aneurysm without requiring two open **iliac arteries**. In this situation, an **occlusion device** is typically placed in one iliac artery (if it is not already blocked) and a **femoral-femoral artery bypass** is performed to maintain blood flow to both legs.

## After The Procedure:

Immediately after recovery from the stent grafting procedure, you may be required to lay flat for four to six hours. This will allow the leg wounds to start healing. Some mild discomfort may be felt at the wounds in the groin. This usually resolves in two days. Side effects may include swelling of the groin area, numbness of the legs, nausea, vomiting, leg pain or throbbing, lack of appetite, fever and/or absence of bowel movement for one to three days.



\* Any commercialized occluding devices or occluding technique can be used

\*\* Femoral-femoral Artery Bypass is an additional surgical procedure which may be required in some cases based on physician's discretion.

## What Symptoms Should Prompt You To Call Your Doctor After The Procedure?

If you experience any of the following symptoms, contact your doctor immediately:

- Pain, numbness, coldness or weakness in the legs or buttocks
- Any back, chest, abdominal or groin pain
- Dizziness, fainting, rapid heartbeat or sudden weakness

A doctor should also be called if you need to reschedule a follow-up visit for any reason.

## Follow-up

It is important to schedule regular follow-up visits with your doctor. Long-term results of the **stent graft** have not yet been established. Most problems with **endovascular** repair do not have symptoms. Thus, follow-up is important to determine the success of your **stent graft**.

Follow-up visits will help the doctor to check your **aneurysm** and **stent graft** on a regular basis. Some problems that might occur are listed in the Risks section of this booklet. Your doctor will schedule follow-up visits depending on your condition. Most often these will occur at one month, one year and annually thereafter. At each visit, **imaging** such as **CT scans** will be carried out to determine the performance of the **stent graft**. If you have poor kidney function, you should ask your doctor about the dyes used in some of these **imaging** studies, as they may be harmful.

Along with other **imaging** to assess the **stent graft** device type, your physician will ask you to have an **ultrasound** to assess the **femoral-femoral artery bypass**. Your physician will work with you to provide you with the appropriate timing and frequency of follow-up **imaging** for both the **femoral-femoral artery bypass** and the **stent graft** device.

## Implanted Device Identification Card

After your **abdominal stent graft** procedure, your doctor will give you a temporary implanted device identification (ID) card. The temporary implanted device ID card will tell you the size and number of your abdominal aortic **stent graft** implants.

Medtronic will mail you a permanent implanted device ID card to carry in your wallet. Your permanent ID card will list the following information:

- Type of device implanted
- Date of implant
- Your doctor's information
- **Magnetic Resonance Imaging (MRI)** information

Be sure to tell all of your healthcare providers that you have the **stent graft** and show them your implanted device ID card. You should keep your patient ID card available at all times.

## Magnetic Resonance Imaging

After being implanted with the **abdominal stent graft** manufactured by Medtronic, it is still safe to have **MRI** procedures, under certain conditions. MRI information is provided on your implanted device ID card. Show this ID card to your healthcare providers.

## Lifestyle Changes

- You will need to go for regular follow up visits to check your **stent graft**.
- Please consult your doctor about your ability to perform strenuous physical activities.

The **abdominal stent graft** is not expected to trigger any passenger screening devices such as airport security scanners. Please consult your doctor to reschedule any follow up visits if you are traveling.

The information and materials contained herein are not to be construed as a medical advice and guidance. You are required to approach your registered medical practioner to seek any advice and clarification on the information provided in this article.

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