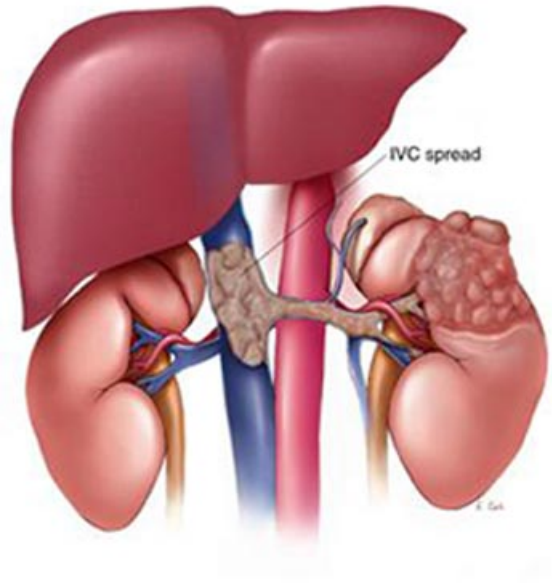
IVC Filters

During Inferior Vena Cava (IVC) filter placement, a device, similar to a metal cage, is placed within the IVC, a large vein in the abdomen that returns blood from the lower half of the body to the heart. Blood clots in the veins of the legs and pelvis can occasionally travel to the lungs where they can cause a life-threatening blockage. IVC filters help reduce the risk of blockage in the lungs by trapping large clots and preventing them from reaching the heart and lungs. They are used in patients who don't respond to or cannot be given conventional medical therapy such as blood thinners.



Your doctor will instruct you on how to prepare for the procedure. You will be advised on any changes to your regular medication schedule and whether you should not eat or drink before your procedure. Tell your doctor if there's a possibility you are pregnant and discuss any recent illnesses, medical conditions, allergies and medications you're taking. Leave jewelry at home and wear loose, comfortable clothing. You may be asked to wear a gown. Plan to have someone drive you home afterward.

What is IVC Filter Placement and Removal?

In an inferior vena cava filter placement procedure, interventional radiologists use image guidance to place a filter in the inferior vena cava (http://www.radiologyinfo.org) (IVC), the large vein in the abdomen that returns blood from the lower half of the body to the heart.

Blood clots that develop in the veins of the leg or pelvis, a condition called deep vein thrombosis (http://www.radiologyinfo.org) (DVT), occasionally break up and large pieces of the clot can travel to the lungs. An IVC filter (http://www.radiologyinfo.org) is a small metal device that traps large clot fragments and prevents them from traveling through the vena cava vein to the heart and lungs, where they could cause severe complications such as pain, difficulty breathing, shortness of breath or even death.

Until recently, IVC filters were available only as permanently implanted devices. Newer filters, called optionally retrievable filters (http://www.radiologyinfo.org) , may be left in place permanently or have the option to potentially be removed from the blood vessel later. This removal may be performed when the risk of clot travelling to the lung has passed. This should be assessed by a physician or the interventional radiologist who inserted the IVC filter sometime after placement, ideally less than six months after insertion. Removing an IVC filter eliminates any long term risks of filter fracture or recurrent DVT. However, it does not address the cause of the DVT. Your referring physician will determine if blood thinners are still necessary. Not all retrievable IVC filters should be removed if the risk of clots traveling to the lung persists and if blood thinners continue to be unusable. These filters can be left in place as permanent filters, but many filters can be removed even after being in place for several years.

What are some common uses of the procedure?

Inferior vena cava (IVC) filters are placed in patients who have a history of or are at risk of developing blood clots in the legs, including patients:

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- diagnosed with deep vein thrombosis (DVT).
- with pulmonary embolus.
- who are trauma victims.
- who are immobile.

IVC filters are used when patients cannot be successfully treated by other methods, including blood thinning agents (http://www.radiologyinfo.org) .

How should I prepare?

Prior to your procedure, your doctor may test your blood to check your kidney function and to determine if your blood clots normally.

Tell your doctor about all the medications you take, including herbal supplements. List any allergies, especially to local anesthetic (http://www.radiologyinfo.org) , general anesthesia (http://www.radiologyinfo.org) , or contrast materials (http://www.radiologyinfo.org) . Your doctor may tell you to stop taking aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs (http://www.radiologyinfo.org)) or blood thinners before your procedure.

Tell your doctor about recent illnesses or other medical conditions.

Women should always tell their doctor and technologist (http://www.radiologyinfo.org) if they are pregnant. Doctors will not perform many tests during pregnancy to avoid exposing the fetus (http://www.radiologyinfo.org) to radiation. If an x-ray is necessary, the doctor will take precautions to minimize radiation exposure to the baby. *See the Radiation Safety (https://www.radiologyinfo.org/en/info/safety-radiation) page for more information about pregnancy and x-rays.*

Your doctor will likely tell you not to eat or drink anything after midnight before your procedure to allow for sedation during placement. Your doctor will tell you which medications you may take in the morning.

The doctor may allow you to drink clear liquids on the day of your procedure if sedation is not needed or planned.

If you are diabetic and take insulin, you should receive instructions on eating and insulin dose from the interventional radiologist, as your usual insulin dose may need to be adjusted on the day of the procedure.

You may need to remove your clothes and change into a gown for the exam. You may also need to remove jewelry, eyeglasses, and any metal objects or clothing that might interfere with the x-ray images.

Plan to have someone drive you home after your procedure.

What does the equipment look like?

In this procedure, a catheter (http://www.radiologyinfo.org) , iodine contrast (x-ray dye), x-ray or ultrasound equipment for imaging guidance and an inferior vena cava (IVC) filter may be used.

A catheter is a long, thin plastic tube that is considerably smaller than a "pencil lead." It is about 1/8 inch in diameter.

X-ray:

This exam typically uses a radiographic table, one or two x-ray tubes, and a video monitor. Fluoroscopy converts x-rays into video images. Doctors use it to watch and guide procedures. The x-ray machine and a detector suspended over the exam table produce the video.

Ultrasound:

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Ultrasound machines consist of a computer console, video monitor and an attached transducer (http://www.radiologyinfo.org) . The transducer is a small hand-held device that resembles a microphone. Some exams may use different transducers (with different capabilities) during a single exam. The transducer sends out inaudible, high-frequency sound waves into the body and listens for the returning echoes. The same principles apply to sonar used by boats and submarines.

The technologist applies a small amount of gel to the area under examination and places the transducer there. The gel allows sound waves to travel back and forth between the transducer and the area under examination. The ultrasound image is immediately visible on a video monitor. The computer creates the image based on the loudness (amplitude), pitch (frequency), and time it takes for the ultrasound signal to return to the transducer. It also considers what type of body structure and/or tissue the sound is traveling through.

This procedure may use other equipment, including an intravenous (http://www.radiologyinfo.org) line (IV), ultrasound machine and devices that monitor your heart beat and blood pressure.

How does the procedure work?

Using image guidance, a catheter is inserted through the skin into a large vein in the neck or upper leg and advanced to the inferior vena cava in the abdomen. Contrast material will be injected into the vein to assess for proper positioning and blood flow within the IVC filter. The IVC filter is then placed through the catheter and into the vein. Once it is in the correct position, the interventional radiologist will release the filter, allowing it to fully expand and attach itself to the walls of the blood vessel.

To remove an IVC filter, a special catheter is inserted into a large vein in the neck or groin and advanced to the site of the filter in the vena cava. A removable IVC filter has a small hook or knob at one end that enables the catheter to capture the filter, close it, pull it into the catheter and then withdraw it from the body without injuring the blood vessel.

How is the procedure performed?

Image-guided, minimally invasive procedures such as IVC filter placement and removal are most often performed by a specially trained interventional radiologist (http://www.radiologyinfo.org) in an interventional radiology (http://www.radiologyinfo.org) suite or occasionally in the operating room.

This procedure is often done on an outpatient basis. However, some patients may require admission following the procedure. Ask your doctor if you will need to be admitted.

The doctor or nurse will position you on your back.

The doctor or nurse may connect you to monitors that track your heart rate, blood pressure, oxygen level, and pulse.

A nurse or technologist (http://www.radiologyinfo.org) will insert an intravenous (http://www.radiologyinfo.org) (IV) line into a vein in your hand or arm to administer a sedative. This procedure may use moderate sedation. It does not require a breathing tube. However, some patients may require general anesthesia (http://www.radiologyinfo.org) .

The nurse will sterilize the area of your body where the catheter is to be inserted. They will sterilize and cover this area with a surgical drape.

Your doctor will numb the area with a local anesthetic (http://www.radiologyinfo.org) . This may briefly burn or sting before the area becomes numb.

The doctor will make a very small skin incision at the site.

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Using image-guidance, the doctor inserts a catheter (http://www.radiologyinfo.org) through the skin to the treatment site.

Contrast material (http://www.radiologyinfo.org) may be injected into the inferior vena cava to help guide the catheter and verify precise placement of the IVC filter in the blood vessel.

When the procedure is complete, the doctor will remove the catheter and apply pressure to stop any bleeding. The nurse will cover this tiny opening in the skin with a dressing.

The doctor or nurse will remove your IV line before you go home.

The procedure is usually completed within one hour.

What will I experience during and after the procedure?

The doctor or nurse will attach devices to your body to monitor your heart rate and blood pressure.

You will feel a slight pinch when the nurse inserts the needle into your vein for the IV line and when they inject the local anesthetic. Most of the sensation is at the skin incision site. The doctor will numb this area using local anesthetic. You may feel pressure when the doctor inserts the catheter into the vein or artery. However, you will not feel serious discomfort.

If the procedure uses sedation, you will feel relaxed, sleepy, and comfortable. You may or may not remain awake, depending on how deeply you are sedated.

You may feel slight pressure when the doctor inserts the catheter (http://www.radiologyinfo.org) , but no serious discomfort.

As the contrast material (http://www.radiologyinfo.org) passes through your body, you may feel warm. This will quickly pass.

You will remain in the recovery room until you are completely awake and ready to return home.

If your IVC filter was inserted through a vein in your neck, you should be able to resume your normal activities within 24 hours. If your filter was inserted through a vein in your groin, you should avoid driving for 24 hours and lifting heavy objects and climbing stairs for 48 hours. Your physician may provide additional post-procedure instructions.

Who interprets the results and how do I get them?

After the procedure is complete, the interventional radiologist (http://www.radiologyinfo.org) will tell you whether the procedure was a success.

Your interventional radiologist may recommend a follow-up visit.

This visit may include a physical check-up, imaging exam(s), and blood tests. During your follow-up visit, tell your doctor if you have noticed any side effects or changes.

What are the benefits vs. risks?

Benefits

- No surgical incision is necessary—only a small nick in the skin that does not need stitches.
- The filter has a high rate of success in protecting lungs from serious pulmonary embolus (PE) in patients who have failed conventional medical therapy or cannot be given conventional medical therapy.

Risks

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- Any procedure that penetrates the skin carries a risk of infection. The chance of infection requiring antibiotic treatment appears to be less than one in 1,000.
- There is a very slight risk of an allergic reaction if the procedure uses an injection of contrast material (http://www.radiologyinfo.org) .
- Any procedure that places a catheter inside a blood vessel carries certain risks. These risks include damage to the blood vessel, bruising or bleeding at the puncture site, and infection. The doctor will take precautions to mitigate these risks.
- There is a chance that the IVC filter can lodge in the wrong place, change position or penetrate through the vein (which can rarely lead to injury of a nearby organ).
- The IVC filter or a piece of the IVC filter may break loose and travel to the heart or lungs causing injury or death.
- Rarely, IVC filters become so filled with clots that they block all flow in the blood vessel, causing swelling in the legs.
- In some cases, retrievable filters become scarred to the vein and cannot be removed, in which case they are left in permanently (as they are also designed to do).

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