



Peripheral Arterial Disease (PAD) (Updated 10.08)

Peripheral arterial disease occurs when the arteries in your legs become narrowed with plaque and cannot bring enough blood to your leg and foot. This condition is a complication of **atherosclerosis**. Arteries are the vessels in your body that supply all the oxygen-rich blood the muscles need to function. When artery walls thicken with plaque, which is made of cholesterol, you have the condition called atherosclerosis. When blood flow in your legs is reduced by atherosclerosis, you will start to see the symptoms of peripheral arterial disease.

During the first stages of PAD, your arteries still provide enough oxygen to your muscles during rest. However, when you are active, such as when you are walking or climbing stairs, your muscles need more oxygen than the narrowed vessels can supply. As a result, the muscles may cramp or feel tired.

As the disease progresses, you may develop pain in the foot and/or leg at rest due to lack of blood flow. This may result in the loss of a limb due to tissue and muscle death (i.e. gangrene).

There are many risk factors for atherosclerosis and PAD. Making changes in your lifestyle or taking medications your doctor prescribes can reduce your risk.

Risk Factors for Atherosclerosis and PAD

- Cigarette smoking
- Diabetes
- High cholesterol or a high fat diet, or both
- Hypertension (high blood pressure)
- Age over 60
- Family history
- Excessive alcohol use
- Sedentary lifestyle

Symptoms of Peripheral Arterial Disease

- Cramping or aching in your hip, buttocks, thighs, or calves after a short walk. This pain is called **claudication**. The pain goes away when you stop the activity, but returns when you move again.
- Pain in your hip, buttocks, thighs, or calves that increases when you climb stairs or go uphill.
- Pain in a limb when you are resting. This is a symptom of severe PAD.

Your Medical Evaluation

The three main components of diagnosing peripheral arterial disease are a history and physical exam by the doctor, a study of your blood flow in the vascular laboratory, and an imaging study called an **arteriogram**, which will pinpoint where the problems are.

Your health history: You'll be asked numerous questions about the symptoms and risk factors you may have for PAD. Try to be specific and mention all your concerns, even if you don't think they are related: they could reveal an underlying symptom. List all your medications, including aspirin, blood thinners, and over-the-counter supplements.

Physical exam: Plaque can form in blood vessels throughout your body. For this reason, your doctor will feel for pulses and listen to blood flow in your major arteries. Your neck, upper arms and abdomen are also likely to be checked. Your feet and legs will be examined carefully for signs for PAD, which include nail changes, changes in skin color and temperature, and sores that will not heal.

If you have PAD, the arteries that carry blood to the heart or brain may also be affected. This puts you at risk for heart attack or stroke.

Tests that Measure Blood Flow

A vascular technician will test the blood flow in your legs and feet. There are several quick and painless tests that will confirm the diagnosis and extent of PAD.

An ankle-brachial index (ABI) is a series of blood pressure readings that compares the blood pressure in your ankle and foot with the blood pressure in your arm.

Doppler ultrasound, which looks at the blood flowing through your arteries. It can show changes in blood flow due to narrowing or blockage of an artery.

Arteriography: If you are diagnosed with peripheral arterial disease, your doctor may perform an arteriogram to locate the damage to your arteries and determine its extent. This test may only take a couple hours and is usually done on an outpatient basis, but with recovery time you should allow a full day.

Before the procedure, you'll be given medication to make you comfortable. After the area is numbed, a long, thin tube called a catheter will be inserted into an artery, usually one of the femoral arteries, through a small puncture in one of your groins. The doctor will carefully thread the catheter through the affected artery, and once it is in place, will inject a contrast dye. The dye shows up clearly on the X-rays, to pinpoint where the artery is narrowed or blocked. After the procedure, you will be monitored while you rest with your leg straight for several hours. Most patients resume their normal activities the following day.

Risks of arteriography include but are not limited to:

- Bleeding
- Allergic reaction to the contrast dye
- Kidney damage (from the dye)
- Small blood clots
- Damage to an artery

Treatment of PAD

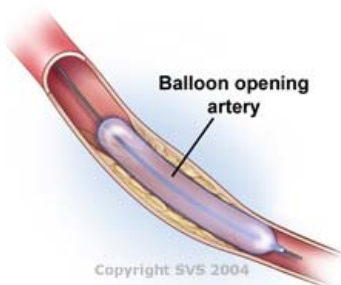
There are some steps you can take to reduce arterial damage caused by kidney damage atherosclerosis. They include:

- Stop smoking right away
- Use a thrombolytic or fibrinolytic drug if prescribed by your doctor to dissolve clots and relieve the pain of claudication

If you have severe peripheral arterial disease, particularly if it does not improve with the measures described above, your doctor may recommend a minimally invasive endovascular treatment to improve the circulation in your legs. If the blockage is more extensive or cannot be treated with an endovascular procedure, bypass surgery may be required.

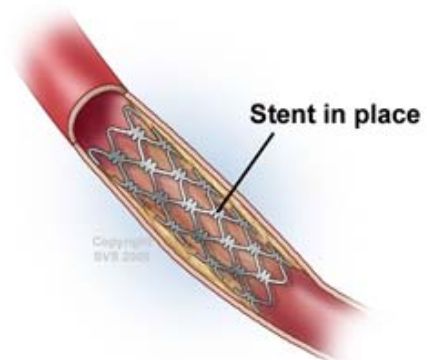
Endovascular Procedures for Peripheral Arterial Disease

Angioplasty and **stenting** are endovascular procedures that may be used to repair a severely narrowed artery or a short blockage. Both can be done through a small puncture, usually at the groin. As a result, general anesthesia isn't needed, so recovery can be much quicker and complications fewer than with open bypass surgery.



Angioplasty uses a tiny balloon to open blocked arteries. The balloon is inflated and deflated several times to press the plaque against the artery wall. Once the artery has been unblocked, the balloon is deflated and removed. Blood can flow freely through the widened artery.

Stenting is the insertion of a tiny wire mesh tube into an artery to hold it open. The collapsed stent is mounted onto a balloon catheter and guided across the blockage. The balloon is inflated to open the stent, which locks into place inside the artery. The balloon is deflated and removed, leaving the stent in place to hold the artery open.



Patient Preparation Information for Endovascular Procedure

Before the Endovascular Procedure

The procedures may take 30 minutes to several hours. You may be required to stay overnight in the hospital. Arrange for a responsible adult to drive you home.

Although you can be awake during the procedure, you will receive a local anesthetic to numb your skin at site of the puncture. You will be given fluids and medications to help you relax through an IV.

The doctor may ask you to refrain from eating or drinking after midnight on the day of your procedure, although you may be asked to take certain of your medications with a sip of water on the morning of your procedure. Be sure you inform your doctor of all medications you take.

After the Endovascular Procedure

For either procedure, you will lay flat after the procedure and may be asked not to bend your leg for 2 to 6 hours. During this time the blood flow in your legs will be closely monitored by nurses who will check your pulses and skin color and temperature. You'll likely go home within hours of your procedure, although some patients spend the night in the hospital. Expect to have some swelling and bruising around the puncture site at the groin, and possibly spreading across your thigh and abdomen. This is normal.

Risks and complications of this procedure include rupture of the treated artery, bleeding, blood clots, heart or lung complications, and kidney problems.

When To Call the Doctor After an Endovascular Procedure

- Bleeding at the catheter insertion (puncture) site.
- Excessive swelling.
- Chest pain or trouble breathing.
- A fever of 101.5 degrees or higher.
- A foot that gets cold to touch or turns a mottled/purple color.
- A return of symptoms similar to those you had before the procedure.

You are always welcome to call the office with your questions or concerns. After hours, an answering service will direct your questions to the on-call providers. However, these individuals are unable to call in prescriptions for pain medication after 5 p.m.

Patient Preparation Information for Treatment of Peripheral Arterial Disease with **Bypass Surgery**

Bypass surgery may be the only option for longer or more severe blockages in an artery. Bypass surgery involves using a graft to create a new pathway for blood around the blockage. The graft may be a synthetic tube or a vein from your leg or arm.

What to expect before, during, and after your surgery

Risks and Complications of Bypass Surgery

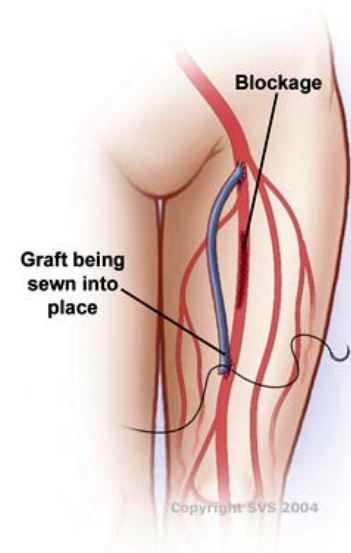
It is important to be aware of the risks and complications before any surgical procedure. The risks and complications for bypass surgery include: bleeding, infection, numbness or pain around the incisions, risks from anesthesia, the need for an amputation or a second surgery to remove dead tissue, and blood clots.

Preparing for Surgery

Your surgeon will tell you how to prepare for your surgery. Be sure to ask any and all questions you may have. On the day of the surgery, do your best to arrive at the hospital on time.

- Some procedures may require blood transfusions. You may choose to donate your own blood before surgery, in case it is needed.
- Stop smoking at least 3 weeks before surgery.
- You may be asked to get an EKG (electrocardiogram), chest x-ray, or blood tests.
- Tell your doctor about all medications you are taking, including vitamins, supplements, and blood thinners.
- The day before surgery, take any medications your surgeon tells you to. Don't eat or drink anything after midnight on the day of the surgery.
- Make sure that you have someone to drive you home from the hospital when you are discharged, usually in 3 to 8 days.

Abdominal Bypass: The large artery in the abdomen is the aorta. If this gets blocked, bypass surgery may be needed. To reach the blockage, the surgeon makes a large incision along the abdomen and two incisions at each groin. A synthetic graft is then sewn into the artery above and below the blocked section. Once blood flows freely through the graft, the incision is closed with sutures or staples.



Leg Bypass: To bypass a blocked leg artery, a healthy vein from that same leg is often used for the graft. The vein may be removed through one long incision or several smaller ones. Other times a vein needs to be removed from the opposite leg or an arm. In some cases, a synthetic graft is used. If possible the surgeon will use a natural vein from one of the extremities because these veins last the longest. Once the graft is ready, the surgeon makes an incision near the damaged artery. The graft is sutured to the artery above and below the blockage. Once blood is flowing through the graft, the incision is closed with sutures or staples. The blocked section of artery is usually not removed.

Peripheral bypass grafts carry blood from the femoral artery, in your thigh, to an artery further down your leg. This graft usually goes to either the popliteal artery near your knee, or to an artery in the lower leg.

Recovering from Bypass Surgery

- You will recover in the hospital for 3 to 8 days after surgery, depending on the type of bypass you have, your health, and your response to surgery. Full recovery may require a month or more.
- After surgery you will be monitored closely in the recovery room, and from there you may go to an intensive care unit or to a regular hospital room. Your abdomen and groin will swell and be painful, but your doctor will prescribe pain medications to control the pain.
- For best recovery, you should start to be active soon after surgery. Typically, on the day after surgery you will get out of bed to sit in a chair. Don't stand or sit with your feet down for a long period of time. When you sit, raise your foot as high as you comfortably can to prevent swelling.
- About 48 hours after surgery, your nurse or physical therapist will assist you in getting up and walking. Walking is very important after surgery. Walking helps to reduce swelling, speeds healing, and helps prevent lung problems such as pneumonia. The sooner you are up and walking, the sooner you can go home. Wear slippers or shoes to protect your feet.
- Tell a nurse right away if you have chest pain, foot pain, or shortness of breath.
- Numbness and tingling in your foot is common after surgery, but tell your nurse if your foot appears mottled or purple in color or feels cold.

Constipation is very common following a surgery. The anesthetic used during the operation paralyzes the bowel, which can lead to constipation for up to a week. Pain medications such as Vicodin or Percocet also cause the bowel to move more slowly. You may try over-the-counter medications such as milk of magnesia, Colace, or Metamucil, as well as prune or apple juice to get your bowels moving.

Pain is common after surgery, especially around an incision site. The pain medication prescribed by your doctor will help with this pain, which should improve in the days following your surgery. Be sure to stay ahead of the pain and take your pain medication as prescribed. Check with your doctor before using other pain medication in addition to the prescribed pain medication.

Fever: Your temperature can vary after surgery and a low-grade temperature is common. If your temperature exceeds 101.5 degrees or if it is accompanied by chills, vomiting, or flu-like symptoms, the doctor should be notified.

Recovering at Home

Activity: When you are at home, remember to elevate your leg as much as possible while you are sitting. Do not stand for a prolonged period of time. You should try to walk periodically throughout the day.

Shower: you can shower 24-48 hours after surgery, unless otherwise instructed by your doctor. There will be sterile tape (called a "steri-strip") over the incision. Leave the tape on while showering. Do not soak in a bath or hot tub. Sometimes an incision is stapled and you won't have steri-strip. In this case you can shower without a bandage. Be sure to dry the area well afterwards.

Incision: Your incisions will be covered by a sterile bandage or steri-strip, which will fall off in time on its own or be removed by the doctor at your post-op visit. A slight drainage of thin watery fluid may occur. Report any drainage from your incision. An infection may be starting if the drainage is thick green or yellow, or if the skin around an incision is red or warm to touch. Some swelling and bruising around the incisions is normal and should improve in the days following your surgery.

If the surgeon used a donor vein from your arm or leg, you will have an additional incision at the donor site. Remember to keep an eye on this incision for signs of infection, too.

Driving: You should not drive until you feel confident about performing an emergency stop without discomfort. Do not drive while taking pain medication. It is considered driving "under the influence" and is dangerous.

When to Call the Doctor

- Fever over 101.5 degrees.
- Increased redness or drainage from an incision.
- Nausea or vomiting.
- Increasing pain in the toes or foot, they have changed color, or you can't move them.
- Difficulty breathing.

When to Go the Emergency Room

- Uncontrolled bleeding from the incisions.
- Persistent vomiting.
- Change in mental status.
- Inability to breathe.

You are always welcome to call the office with your questions or concerns. After hours, an answering service will direct your questions to the on-call providers. However, these individuals are unable to call in prescriptions for pain medication after 5 p.m.