



Atherosclerosis

Circulating the Facts About Peripheral Vascular Disease

*Brought to you by the Education Committee
of the Society for Vascular Nursing*

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ATHEROSCLEROSIS

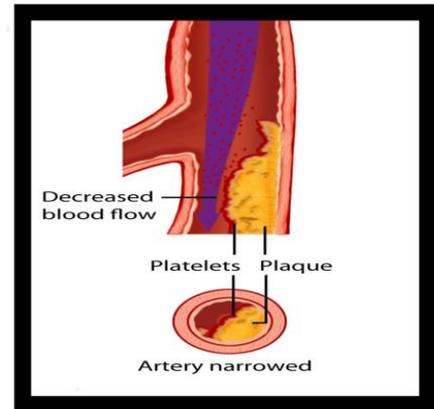
- What is **ATHEROSCLEROSIS**?
- Signs and symptoms
- Risk factors
- Prevent further disease
- Diagnostic tests

What Is Atherosclerosis?

Blood flows through tubes called **arteries** which carry oxygen and food to your body and internal organs. Atherosclerosis is a buildup of cholesterol and fat in the artery and is also known as **plaque**.

Arteries become blocked and narrowed due to atherosclerosis and this affects blood flow to your body.

Atherosclerosis can affect any artery in the body, including arteries in the heart, brain, arms, legs, pelvis, and kidneys.



Signs and Symptoms

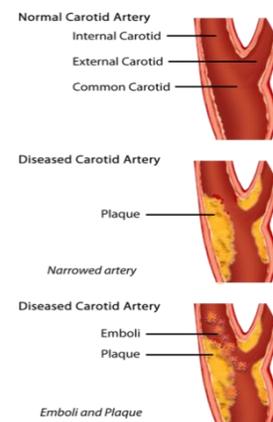
Signs and symptoms of atherosclerosis are related to the location and amount of narrowing (plaque) that causes decreased blood flow through arteries. The following arteries can be affected by atherosclerosis:

Carotid Arteries

Blood flows to your brain through the carotid arteries located on either side of the neck.

Plaque that narrows or blocks blood flow in the carotid arteries may cause:

- Sudden body weakness
- Weakness/ unable to move one side of the body
- Sudden imbalance or falling
- Droop on one side of the mouth or face
- Temporary or permanent blindness or loss of the vision in one eye
- Difficulty speaking and understanding words
- Memory loss or sudden confusion
- Loss of consciousness
- Sudden and severe headache
- Difficulty with breathing



Coronary Arteries

Blood flows to your heart through the **coronary arteries**. Narrowing or blockage in the coronary arteries prevents oxygen rich blood from getting to the heart muscle

Plaque that narrows or blocks blood flow in arteries to the heart and may cause:

- Squeezing, pressure, pain in the chest
- Pain in the jaw, shoulder, abdomen, arm, neck, or back
- Difficulty breathing
- Sweating, nausea or vomiting
- Weakness or dizziness which may cause imbalance or falling

Renal Arteries

Blood flows to your kidneys through the renal arteries. Narrowing or blockage in the renal arteries can result in decreased function of your kidneys.

Plaque that narrows or blocks blood flow in arteries to the kidneys may cause:

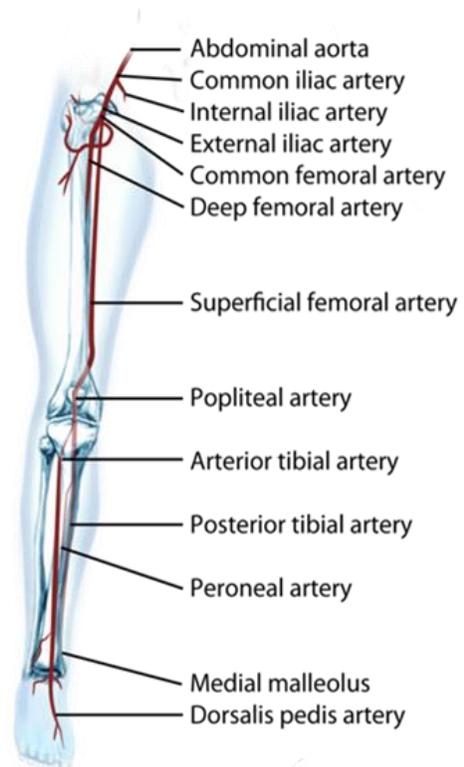
- Uncontrolled high blood pressure
- Heart Failure (fluid backs up into lungs)
- Kidney Failure (symptoms):
 - Decreased or increased urination
 - Swelling of the hands and legs associated with weight gain
 - Feeling tired or fatigued
 - Loss of appetite

Peripheral Artery Disease (PAD)

Plaque that narrows or blocks blood flow in largest artery in the body (aorta) and in arteries to your arms, pelvis, and legs can cause **Peripheral Artery Disease (PAD)**.

Signs and symptoms of Peripheral Artery Disease (PAD):

- Painful cramping, fatigue, or weakness in the hip, thigh or calf muscles after activity, such as walking or climbing stairs
- Coldness in the lower leg or foot, when compared with the other side
- Sores on your toes, feet or legs that won't heal



- Hair loss, slow hair growth, and shiny skin on your legs
- Thickened nails
- When the narrowing or blockage of the arteries worsens, pain in the toes and feet may occur at rest, as well as when walking

Risk Factors

Although atherosclerosis may occur at any age, the disease is more common in people over the age of 45, the exact cause is not known.

There are two types of risk factor for atherosclerosis; risk factors that can be controlled or changed, and ones that cannot be controlled or changed.

Risk Factors that can be changed

- Tobacco use and exposure to second hand smoke
- High blood pressure (hypertension)
- Abnormal levels of blood **cholesterol** and fat
- Diabetes
- Heart disease
- Obesity
- Lack of regular exercise



Risk Factors that cannot be changed

- Age
- Sex (male/female)
- Family history of artery disease
- Race
- Genetic conditions

Prevent Further Disease

STOP SMOKING AND USING TOBACCO PRODUCTS

- Tobacco in any form (pipes, cigars, regular/low tar cigarettes, chewing tobacco) should be avoided to prevent narrowing and blockage of arteries.
- Nicotine in tobacco increases the risk of atherosclerosis.
- Tobacco use in any form decreases oxygen in the bloodstream and can cause clots to form.
- Stopping smoking and tobacco use is important to prevent and treat atherosclerosis.
- Products are available from any healthcare provider to assist in stopping smoking or use of tobacco.

DIET

- Avoid foods that are high in cholesterol and fats. Cholesterol can be deposited on the walls of arteries and form a hard substance called plaque.
- Limit intake of high cholesterol and fat foods: eggs, red meat, whole milk, cheese and ice cream are all high in cholesterol and fat.
- Cholesterol and fat can cause plaque, which causes arteries to become narrow, blocked and decreasing blood flow due to atherosclerosis.
- A healthy diet includes intake of 5 servings per day of leafy green vegetables and fruits.

HIGH BLOOD PRESSURE

- Blood pressure is a measure of the pressure against the walls of the arteries.
- Uncontrolled high blood pressure (hypertension) makes the heart and arteries work harder.
- High blood pressure usually causes no symptoms.
- Medication controls high blood pressure and cannot be cured.
- Blood pressure and medication checks should be done regularly by the healthcare provider.

DIABETES

- Those who have diabetes are at high risk for atherosclerosis.
- Diabetes effects on the body can be identified and treated early.
- Following directions and monitoring by a healthcare team can help prevent complications due to diabetes.

EXERCISE

- Discuss plans to start exercise with a healthcare provider before beginning.
- Regular, daily exercise helps prevent or control atherosclerosis.
- Exercise improves circulation to the legs and body and may improve cholesterol levels.
- Exercise, such as walking, is safe and helps most people.

Diagnostic Tests

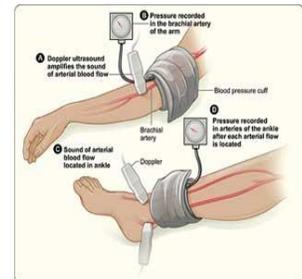
- The healthcare provider will check blood pressure, examine the body and ask questions about signs and symptoms of narrowing or blocked arteries (atherosclerosis).
- The healthcare provider may order tests to determine if narrowing or blocked arteries (atherosclerosis) are present.

Noninvasive Diagnostic Imaging

Noninvasive testing is painless. It does not require the use of needles, contrast or x-ray.

Vascular Ultrasound (Duplex) Imaging

- Ultrasound is a test that uses sound waves to produce pictures of blood vessels in different parts of your body.
- The ultrasound test uses gel and a transducer (a hand-held sensor probe used on the skin's surface) that can create pictures of blood vessels, measure blood flow and detect narrowing or blockage in blood vessels.



Carotid Ultrasound (Duplex) Imaging

- **Carotid** Ultrasound (Duplex) imaging is used to measure blood flow and detect narrowing in the carotid arteries located on both sides of the neck.
- The ultrasound test uses sound waves, gel and a transducer to produce images.

Abdominal Aorta Ultrasound (Duplex) Imaging

- The Abdominal Aorta ultrasound test can detect an enlarged **aorta (aneurysm)** and measure the size.
- This test includes the use of gel and a transducer that can create pictures of the aorta and blood vessels in the abdomen, measure blood flow and detect narrowing or blockage in blood vessels.
- Do not eat or drink several hours before the abdominal aorta ultrasound test.

Ankle Brachial Index (ABI)

- Comparison of blood pressure in your ankle to blood pressure in your arms.

Pulse Volume Recording Doppler (PVR)

- The healthcare provider may order a test to make measurements of the blood flow at different points along your legs during rest and exercise.
- Blood pressure cuffs are placed around your arms and legs and pressure readings are compared.
- While walking on a treadmill the blood pressures will be repeated in the arms and legs.
- This type of testing can detect the location and severity of atherosclerosis in the legs.

Invasive Diagnostic Imaging

You may need to have tests that require the use of needles, contrast (intravenous dye) and/or x-ray. You will be told of any instructions needed before the test. Tell your healthcare provider if you have any allergies beforehand.

Magnetic Resonance Imaging (MRI):

- An x-ray procedure that does not use radiation. Strong magnetic fields and radio waves with a computer make detailed pictures of the body. If you have a pacemaker or other metal device, you cannot have a MRI.

Magnetic Resonance Angiography (MRA):

- A type of MRI that gives pictures of blood vessels in the body. The test uses a contrast medium to help see the blood vessels. An intravenous (IV) line is inserted in your arm through which contrast is injected. Pictures of blocked and narrowed arteries can then be seen. If you have a pacemaker or other implanted metal devices, you cannot have a MRA.

Computed Tomography Angiography (CTA):

- This test is similar to the MRA. Contrast is injected through an IV. The contrast creates images of blockages and/or narrowing of the arteries and x-ray pictures are taken.

Computed Tomography (CT) Scan:

- **CT scan** uses a computer to create picture images using x-rays of different parts of the body.
- The CT Scan is a donut shaped x-ray machine and the patient lies on a table and moves through the machine.

Angiography/Angiogram:

- This is an x-ray test that looks at the blood vessels in the body. The test is done in a specialized x-ray room. Contrast is injected through a catheter (hollow tube), put in into an artery in your groin or arm through a skin puncture site. The skin will be numbed so you will not feel the area being worked on.
- The contrast highlights the blood vessels while x-rays are taken.
- This will show narrowing or blockage of the arteries in a different way than a MRI or MRA. Afterwards, the tube will be removed and a bandage will be applied to the skin puncture.
- An angiogram on average takes between 30 to 60 minutes.
- You may not be able to eat or drink before the study. You will be awake but will be given medication to help you relax. Depending upon the catheter location, after the study you may be asked to lie flat for a few hours. Your blood pressure and bandage over the skin puncture will be checked often. Your healthcare provider may give you specific instructions.