



## **Vascular Disease Information Guide**



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# Risk Factors of Vascular Disease

There are several risk factors that increase the risk of developing atherosclerosis and vascular disease.

- Family History
- Age (risk increases over age 60)
- Gender
- Race
- High Blood Pressure
- Diabetes
- Lack of Physical Activity
- Obesity
- High Cholesterol
- Smoking

There are some risk factors we cannot change:

**FAMILY HISTORY** – there is increased risk when there are other family members with vascular disease. However, this risk is probably made worse when combined with other factors such as smoking and high blood pressure.

**AGE** – risk increases over age 60 for men and women.

**GENDER** – men have a greater risk of vascular disease than women. However, as women get older their risk increases also.

**RACE** – African Americans have more than twice the risk of death and disability from the vascular disease causing stroke than Caucasians. This occurs because there is a higher incidence of smoking, high blood pressure, sickle cell anemia, diabetes and high cholesterol among African Americans.

There are other risk factors that **CAN** be changed or modified:

**HIGH BLOOD PRESSURE** – is a continued elevation of the blood pressure above the normal range—140/90 or higher. Also called “hypertension,” it can damage the heart, kidneys and other organs. High blood pressure is a major factor with strokes. It can be controlled with diet, exercise, and, if necessary, medications.

**SMOKING** – speeds up the development of atherosclerosis, increases blood pressure, can increase the development of aneurysms, and can alter the function of some blood cells that increases the risk of stroke. Smokers have over twice the risk of dying from vascular disease than nonsmokers. Nonsmokers who breathe in the smoke in their environment also suffer from the effects of smoke (called passive smoking). People who quit smoking start to reduce their risks for vascular disease almost immediately. After several years, their death rate is almost as low as that of people who have never smoked.

**HIGH CHOLESTEROL** – Cholesterol is a substance that our bodies make, and it is also in some of the foods that we eat (e.g. red meats, egg yolks, butter, cheeses, etc.). High cholesterol contributes to the development of atherosclerosis. A low fat diet, and decreasing the amount of high cholesterol foods that we eat, can decrease cholesterol levels and the risk for atherosclerosis. Occasionally, medications are required to decrease cholesterol levels.

**OBESITY** – When the body weighs more than normal, there is increased strain on the heart to pump blood throughout the body. Obese people typically eat a high fat diet, leading to high cholesterol levels. Blood pressure rises to meet the demands on the heart and circulation systems. Obese people have three times the risk for heart attack and stroke than people of normal weight. Controlling weight decreases several of the risk factors for atherosclerosis.

**LACK OF PHYSICAL EXERCISE** – People who do very little exercise tend to be overweight, have high blood pressure and lack of tone in muscles throughout the body. They are at increased risk for heart attack and stroke. Exercise tones the muscles, stimulates circulation, helps prevent excess weight and promotes a general feeling of well-being.

**DIABETES** – Diabetes is associated with an increased occurrence of atherosclerosis. Careful monitoring and control of blood sugar has been shown to reduce the damage to the small blood vessels throughout the body and reduce the risk for stroke, heart and kidney disease.

Please see the information on the following pages to find out about some of the local resources that are available to help you reduce your risk for heart disease, stroke and circulation problems.



# Carotid Artery Disease

The carotid arteries are located on either side of your neck and carry blood to your brain. The common carotid artery divides into the internal and external carotid arteries in the middle of the neck. The external carotid artery delivers blood to the face and scalp, and the internal carotid artery delivers blood flow to the brain. The area where the internal and external carotid artery divides is particularly prone to develop atherosclerotic plaque. This plaque narrows the artery and can either completely obstruct flow to the brain or a piece of the plaque can break free and travel to the brain and cause a stroke. The greater the severity of the narrowing, the higher the risk of stroke.

## **SIGNS AND SYMPTOMS**

There are a number of signs and symptoms that can come from carotid artery stenosis. They include:

1. Numbness/weakness or loss of coordination of an arm and/or leg on one side of the body.
2. Drooping on one side of the face or mouth.
3. Change or loss of vision in one eye.
4. Thick, garbled speech, or the inability to speak or understand speech.
5. Episodes of memory loss.
6. Loss of consciousness.
7. Bruit or abnormal sound in carotid artery.



## TREATMENT

Your doctor will discuss several different treatment methods for carotid artery stenosis. Typically, the treatment is based on the degree of stenosis or narrowing of the artery, the symptoms you are having and your overall medical condition. There are three major methods of treatment: medication, surgery or angioplasty and stenting.

1. Medication – Mild to moderate stenosis of the carotid arteries can be treated with medication alone. These medications reduce the risk of stroke and include Aspirin, Plavix or occasionally Warfarin (Coumadin). These agents make your blood less likely to clot and reduce your chances of stroke. Although these medications may be effective, if you have a significant narrowing of the carotid artery, surgery is the most effective treatment.
2. Surgery – Surgical repair is typically required when the narrowing of the carotid is severe. The operation is called a carotid endarterectomy. The surgeon makes an incision down the side of your neck and exposes the carotid artery. The artery is then clamped and opened. Often your surgeon will insert a “shunt” in the artery to maintain blood flow to that side of your brain while he works. The plaque that obstructs the artery is removed and the incision in the artery is closed.

Often the surgeon will close the incision in the artery with a “patch” that will reduce the chances of recurrent narrowing. Some patients need surgery on both the right and the left carotid arteries. One artery is repaired at a time, with a few weeks to a few months in between the surgeries.

3. Angioplasty and Stenting – A new method of treating carotid artery stenosis is balloon angioplasty and stenting. With this procedure your doctor will insert a catheter into an artery in your groin or arm and advance it through the narrowing in the artery in your neck. A special balloon catheter will be used to compress the plaque, thereby opening the artery. This area will be kept open with the placement of a stent (wire support or “bird cage”) over the catheter. The advantage of this technique is that it does not require an incision or deep anesthesia. However, it is a relatively new procedure and is considered experimental at this time. Currently, this procedure is performed under research protocol only.

Each of these methods of treatment has advantages and disadvantages; therefore, it is important to understand that the same therapy is not the best for all patients. Your doctor and the vascular team will determine which of the above treatments is best for you and will discuss this with you.



# Peripheral Vascular Disease

Peripheral vascular disease is caused by atherosclerosis which causes a build-up of plaque inside the arteries that decreases the blood flow of oxygen and nutrients to the muscles and tissues of the legs and feet (this is called ischemia).

## SIGNS AND SYMPTOMS

The signs and symptoms of peripheral vascular disease may include:

1. Intermittant Claudication – cramping pain in the muscles of the buttocks and/or legs that occurs with walking and exercise, and decreases with rest.
2. Rest Pain – as arterial disease progresses, pain occurs at rest, often located on the top of the foot and across the toes. Pain is worse when feet/legs are elevated; pain decreases when the legs are lowered, as blood flow increases to the foot.
3. Tissue Breakdown and Gangrene – as arterial disease progresses further, the skin begins to breakdown and ulcers can develop. When tissues are unable to get the circulation needed for growth and repair, gangrene (death of the tissue) can occur.
4. Other possible signs and symptoms of peripheral vascular disease include:
  - decreased hair growth on feet/legs
  - paleness of the leg or foot when elevated
  - discoloration of the foot/leg when hanging down
  - decreased ability to spread toes and move feet
  - absence of pulses
  - coolness of the foot/leg
  - numbness or tingling

## TREATMENT

The treatment for peripheral arterial disease includes exercise therapy, risk factor modification, medication or surgery.

1. Exercise Therapy – an exercise program, including walking, can help to train the muscles of the legs to work with reduced blood flow and can increase collateral blood flow. This can help to decrease leg pain and increase the ability to ambulate more comfortably.
2. Control or Reduce Risk Factors – smoking cessation, control of cholesterol and triglycerides, high blood pressure and, for diabetics, controlling blood sugar. The modification of risk factors can slow the progression of atherosclerosis and decrease the symptoms of vascular disease.
3. Medications – there are several medications that can be used to “improve” circulation. They act by

helping the blood move through the arteries more easily. Some of these medications are aspirin, Plavix, Pletal and Aggrenox. The correct combination of medicines is based upon the nature of your disease and other medical conditions.

4. Surgery – surgery is indicated for patients who have severe peripheral vascular disease which is causing severe limitation of lifestyle or occupational activity. In the presence of rest pain, a non-healing ulcer or gangrene of the toes or foot, surgical intervention is usually necessary to restore and/or maintain the viability of the limb.

## **TYPES OF INTERVENTIONS AND SURGERY**

1. Balloon Angioplasty – this procedure may be used for short areas of blood vessel narrowing. A small tube, or catheter, with a balloon at the end of it, is placed in the artery at the area of narrowing. This balloon is then deflated and the catheter is removed. Contrast material is injected and X-rays are taken to determine if the artery has opened adequately. If not, the procedure is repeated. Occasionally, a small stent (wire support or “bird cage”) is inserted into the artery to keep the area open.
2. Thrombolytic Therapy – in this procedure, special medication is given through a catheter into the blood vessel to dissolve blood clots. The medication may be given for several hours to a few days to dissolve the clot. X-rays are taken regularly to see if the clot is dissolving.
3. Atherectomy – a small catheter with a cutting blade is introduced into an artery. The blade cuts into the plaque at a high speed and small pieces of the plaque are removed. This procedure can be done using injection of contrast, with a balloon angioplasty or during surgery.
4. Endarterectomy – this surgery involves opening the diseased artery, removing the plaque and closing the artery with sutures. This may be done alone or with other procedures at the same time.
5. Bypass – this is a surgical procedure where the obstruction in the artery is bypassed. A patient’s own vein or a graft made from synthetic material may be used. The graft is attached from above the blockage to below the blockage, thus restoring good blood flow to the limb.

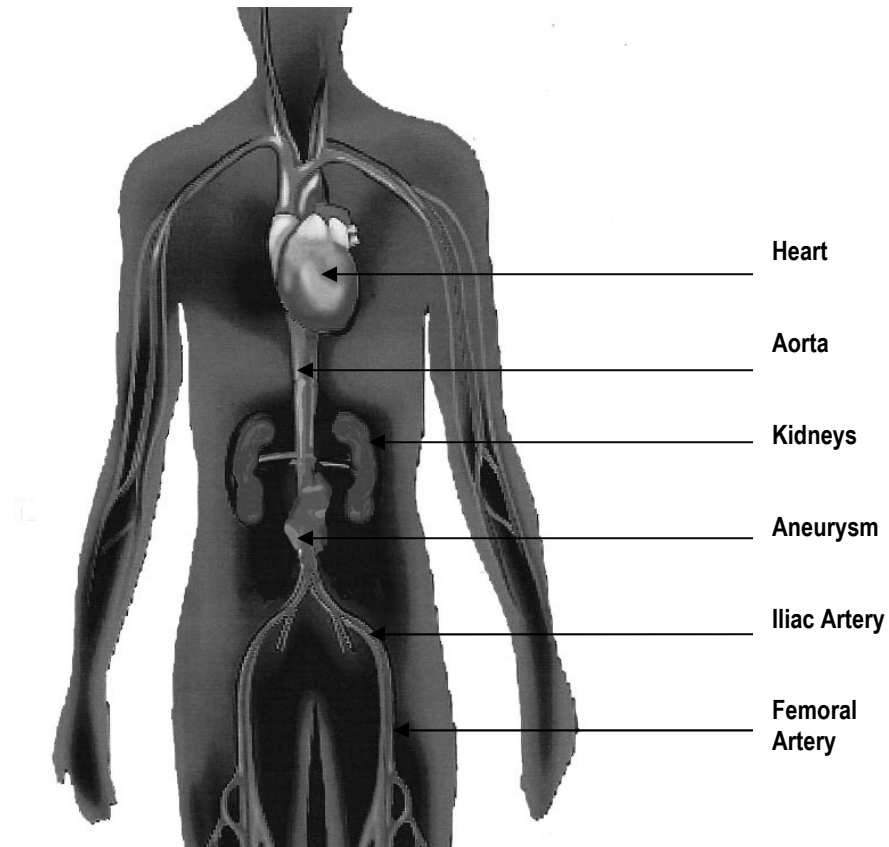
Each of these methods of treatment has its own advantages and disadvantages; therefore, it is important to understand that the same therapy is not best for all patients. Your doctor and the vascular team will determine which of the above treatments is best for you and will discuss this with you. Feel free to ask questions regarding any of these treatment alternatives.



# Abdominal Aortic Aneurysm (AAA)

An aneurysm is a swelling or enlargement of a blood vessel. An abdominal aortic aneurysm (AAA) is an aneurysm affecting your aorta, the largest artery in your body. The aorta originates from the heart and travels down your body, just in front of your spine. As it travels down your body it gives off branches, or arteries, that supply blood to all your organs, including your stomach, intestines, liver and kidneys. It finally splits into the iliac arteries at about the level of the belly button and supplies blood to the legs. Over 90% of aneurysms in the aorta occur in the section of the aorta in your abdomen just below arteries to the kidneys.

Over 80% of aneurysms occur in males and take years to form. There are no symptoms associated with the development of an aneurysm, and therefore, patients may not be aware they have an aneurysm until it ruptures. When an aneurysm ruptures, it causes intense back or abdominal pain and can cause loss of consciousness. Seventy to ninety percent of patients with a ruptured aneurysm will not survive. Doctors may detect an aneurysm prior to rupture by physical examination or by ultrasound, X-ray, CT or MRI. The risk of rupture of an aneurysm is related to the size of the aneurysm—the larger the aneurysm, the greater the risk. When the risk of rupture exceeds the risk of repair, your physician will recommend surgery.



## **SIGNS AND SYMPTOMS**

1. Most people do NOT have any symptoms.
2. A mass may be felt in the abdomen, or a pulsation may be seen when the person is laying down.
3. Pain may occur if the aneurysm presses on nerves or nearby organs.
4. Small blood clots, called emboli, may shower from the aneurysm, moving into the feet, causing the toes to turn blue and painful.
5. When an aneurysm bursts, there is sudden, severe pain that is felt in the abdomen or back. The person feels faint from low blood pressure and then rapidly goes into shock. Death will occur unless the blood pressure is maintained and the person receives surgical repair immediately.
6. Most aortic aneurysms are found during examinations or tests performed for other reasons.

## **TREATMENT**

The decision to treat a patient with an aortic aneurysm is based on the risk of the operation versus the risk of the aneurysm rupturing. Typically, surgery is recommended when the aneurysm reaches 4-5 cm in diameter. Some aneurysms are not treated until they are much larger if the patient is older or has other medical conditions that significantly increase the risk of surgery. Your surgeon will discuss this with you prior to repair.

The treatment of an abdominal aortic aneurysm is the replacement of the section of the aorta that is weak and dilated. This can be done with either conventional open surgery, endovascular surgery (minimally invasive techniques) or both.



# Glossary

## Common Terminology associated with Vascular Disease

**Aneurysm** – a swelling, or enlargement, of a blood vessel.

**Angiogram** – an X-ray image of a blood vessel injected with contrast material.

**Aorta** – the largest artery in the body which extends from the top of the heart into the abdomen, where it branches into smaller arteries that extend down into the legs.

**Arteriole** – a very small artery.

**Arteriogram (Angiogram)** – a diagnostic test that uses X-rays and contrast material to show blood flow through blood vessels.

**Artery** – a blood vessel that carries blood in a direction away from the heart.

**Atheroma** – an abnormal mass of fat or lipids, either in a cyst or in deposits in an arterial wall.

**Atherosclerosis (Arteriosclerosis)** – a common disorder of the arteries where layers of plaque made up of fats and cholesterol build up on the vessel wall, decreasing the size of the inside of the artery; “hardening of the arteries.”

**Atherectomy** – surgical removal of an atheroma in a major artery.

**Balloon Angioplasty** – a method of dilating or opening an obstructed blood vessel by threading a small balloon-tipped catheter into a vessel. The balloon is inflated to widen the blood vessel.

**Bypass** – any one of various surgical procedures to reroute the flow of blood from one area to another.

**Capillaries** – a very small blood vessel that connects arterioles and venules.

**Cat Scan (CT Scan)** – Computerized Tomography, a diagnostic test that uses special X-rays and contrast dye to show detailed cross sections of tissue structures and blood vessels.

**Catheter** – a hollow, flexible tube that can be inserted into a vessel or cavity of the body to withdraw or instill fluids, monitor for various types of information, and look at a vessel or cavity.

**Cholesterol** – a waxy lipid found in animal tissues; a factor in the development of atherosclerosis.

**Circulation** – movement of an object or substance through a circular course so that it returns to its starting point, such as circulation of blood through arteries and veins.

**Claudication** – cramp-like pains in the calves of the legs caused by poor circulation of blood to the muscles; commonly associated with atherosclerosis.

**Collateral** – a small branch of an artery or vein.

**Diabetes Mellitus** – a complex disorder of carbohydrate, fat and protein metabolism that is primarily due to a lack of insulin secretion by the beta cells of the pancreas, or defects in the body's ability to use insulin.

**Doppler Ultrasound** – a test to check the movement of blood flow. It allows the examiner to hear sounds that indicate changes in blood flow caused by blockage or changes inside the blood vessel.

**Duplex Scanner** – an ultrasound machine that uses Doppler to allow the examiner to determine the direction of blood flow within the blood vessel.

**EKG (Electrocardiogram)** – a graph that shows the electrical activity of the heart muscle.

**Embolus** – a foreign object, a quantity of gas or air, a bit of tissue or tumor, or a small blood clot that circulates in the bloodstream until it becomes lodged in a vessel.

**Endarterectomy** – the surgical removal of plaque from the inside of a blood vessel.

**Endovascular** – within the blood vessels.

**Erectile Dysfunction** – the inability to initiate and/or maintain erection of the penis.

**Gangrene** – tissue death caused by lack of blood flow and oxygen.

**Grafts/Bypass** – man-made material or vein that is used to reroute blood flow.

**Hypertension** – high blood pressure.

**Ileus** – a lack of function in a part of the bowel which causes the bowel to enlarge and fill with gas; a blockage in the bowel.

**Incentive Spirometer** – a method used to encourage deep breathing using a device that shows the amount of air that a person breathes in.

**Intermittant Claudication** – cramping pain in the muscles of the buttocks, thighs or calves that occurs with walking and exercise. This pain is relieved quickly by rest.

**Invasive** – tests or procedures that require puncture of the skin or insertion of a device into a body cavity.

**MRA (Magnetic Resonance Arteriography)** – a non invasive diagnostic test that uses a magnet to show the flow of blood.

**MRI (Magnetic Resonance Imaging)** – a non invasive diagnostic test that uses a magnet to show details of body tissues.

**Non-invasive** – techniques or tests that do not require the skin to be broken or body cavities to be entered.

**Occlusion** – a blockage in a canal, vessel or passage of the body.

**Plaque** – cholesterol and fatty material build-up on the inner lining of an artery.

**Renal** – pertaining to the kidney.

**Rest Pain** – pain in the toes or the foot that is caused by poor blood flow; usually worse at night and can be relieved by lowering the foot to the floor or by walking.

**Retrograde Ejaculation** – movement of semen back into the urinary bladder rather than out through the penis.

**Staple** – a piece of stainless steel wire used to close surgical wounds.

**Stenosis** – a narrowing of a passageway or vessel.

**Stent** – a wire cage used to keep a vessel open.

**Suture** – a surgical stitch made of fiber or silk used to close an incision or wound.

**Symptom** – a feeling or experience that indicates the presence of disease.

**Telemetry** – the electronic transmission of data from one point to another. For example, a heart monitor on a patient that sends a picture of the electrical activity of the heart to a monitor in another place where someone is watching the heart activity.

**Thrombolytic Therapy** – giving a medication to dissolve an arterial blood clot.

**Thrombophlebitis** – inflammation of a vein with the formation of a blood clot.

**Thrombus** – a collection of blood cells and other materials that attaches to the wall of a vein or artery.

**Triglycerides** – a fat compound made up of three molecules of fatty acid.

**Ulcer** – a loss of tissue cells on the skin or mucous membrane caused by lack of blood flow, infection, inflammation or malignant processes.

**Ultrasound** – high frequency sound waves used in diagnostic tests that detect the movement of blood cells in blood vessels.

**Varicose Veins** – a twisting, enlarged vein with valves that do not function to hold blood effectively.

**Vein** – a blood vessel that carries blood back to the heart.

**Ventilator** – a machine that assists with breathing.

