

# Peripheral Arterial Disease

Heart disease is the #1 killer in the United States. **Peripheral Arterial Disease (PAD)**, clogged or narrowed arteries in the legs, is a red flag that the same process may be going on elsewhere because PAD is associated with other life-threatening vascular diseases. Through early detection, interventional radiologists can save patients from future stroke, heart attack, and early death. To combat this major public health issue, the Society of Interventional Radiology recommends greater screening efforts by the medical community through the use of the ankle brachial index (ABI) test.

## History of PAD

### PAD Under-Recognized in Women

Like heart disease, peripheral arterial disease is under-recognized in women. According to a survey of primary care physicians conducted in 2002, nearly all recognized that older people are more susceptible to PAD, and identified men as being susceptible to PAD. However, they mostly excluded women as likely to have PAD, which is incorrect. The prevalence is actually equal on the diagnostic ABI test. As vascular experts, interventional radiologists are partnering with primary care physicians to increase early screening.

Twelve to 20 percent of Americans older than 65 suffer from peripheral arterial disease but only one-third are symptomatic. Symptoms can include pain when walking that subsides at rest, leg cramps, pain at rest, numbness and skin discoloration, sores or other symptoms of skin breakdown. Women may be more likely than men to have PAD **without experiencing symptoms**; 50 to 90 percent are asymptomatic or have unrecognized symptoms of the disease, which could put them at greater risk of developing serious disease before it is diagnosed and treated. Specifically, women are also less likely to have intermittent claudication symptoms, i.e., pain when walking that subsides at rest.

### Treatment is Most Effective When Catching the Asymptomatic Warning Signs Early

Identifying PAD while asymptomatic may be life-saving for women, since it allows the easy, cheap identification of a systemic disease that may be treated. Treatment may greatly influence the patient's outcome. These treatments may include further investigation into the state of disease in the coronary

arteries, which could lead to heart disease, and carotids, which could lead to stroke, as well as the legs, and treating the significant areas of blockage that are found. Treatment with lifestyle modification and medication may slow the natural advancement of the disease.

## **Legs for Life Data and Gender Differences**

The influence of gender on PAD has not been studied and is not defined in the medical literature. However, there is some data collected by the Society of Interventional Radiology Foundation through its Legs For Life national PAD screening program. From 1999 to 2002, 3,762 people were screened: 2,786 (74%) women and 976 (26%) men. Of the women screened, 1,067 (38%) were at moderate to high risk for PAD compared to 284 (29%) of men screened. Neither smoking nor diabetes was an independent risk factor for PAD by gender, i.e., the risk of having PAD for smokers and diabetics was similar, in both males and females.

Legs For Life has been successful at attracting women to free screenings and is identifying previously under-diagnosed women who are at moderate to high risk for PAD. This SIR Foundation program provides the opportunity to identify asymptomatic and symptomatic women earlier, allowing women to benefit from the same aggressive approach to risk reduction and treatment as men.

Providing a list of risk factors for PAD may enable them to be more active in their health care and seek an ABI test and consult with an interventional radiologist to be assessed for vascular disease.

## **About Peripheral Arterial Disease**

PAD is a common circulation problem in which the arteries that carry blood to the legs or arms become narrowed or clogged. This interferes with the normal flow of blood, sometimes causing pain, but often causing no symptoms at all. The most common cause of PAD is atherosclerosis, often called "hardening of the arteries." Atherosclerosis is a gradual process in which cholesterol and scar tissue build up, forming a substance called "plaque" that clogs the blood vessels. In some cases, PAD may be caused by blood clots that lodge in the arteries and restrict blood flow. Left untreated, this insufficient blood flow may lead to limb pain, ulceration, gangrene, or amputation in some patients.

In atherosclerosis, the blood flow channel narrows from the buildup of plaque, preventing blood from passing through as needed, restricting oxygen and other nutrients from getting to normal tissue. The

arteries also become rigid and less elastic, and are less able to react to tissue demands for changes in blood flow. Many of the risk factors—high cholesterol, high blood pressure, smoking and diabetes—may also damage the blood vessel wall, making the blood vessel prone to diffuse plaque deposits.

## **Risks of PAD: Heart Attack, Stroke and Death**

The ABI, a comparative blood pressure reading in the arm and ankle, is used to screen for peripheral arterial disease. It is a direct measure of fatty plaque buildup in leg arteries and an indirect gauge of plaque accumulations throughout the entire cardiovascular system. Because atherosclerosis is a systemic disease, women developing plaque in their legs are likely to have plaque building up in the carotid arteries, which can lead to stroke, or the coronary arteries, which can lead to heart attack. Early detection of PAD is important because these women are at significantly increased risk, and preventive measures can be taken.

- Women with PAD have **four** times the risk of heart attack and stroke.
- A person with an ABI of 0.3 (high risk) has a 2 to 3 fold increased risk of 5-year cardiovascular death compared to a patient with an ABI of 0.95 (normal or low risk).

## **Symptoms of PAD**

- The most common symptom of PAD is called claudication, which is leg pain (usually in buttocks, thighs, or calves) that occurs when walking or exercising and disappears when the person stops the activity.
- Other symptoms of PAD include: numbness and tingling in the lower legs and feet, coldness in the lower legs and feet, hair loss, and ulcers or sores on the legs or feet that don't heal.

Many people simply live with their pain, assuming it is a normal part of aging, rather than reporting it to their doctor.

## **Get Tested for PAD if You**

- Are over age 50
- Have a family history of vascular disease, such as PAD, aneurysm, heart attack or stroke
- Have high cholesterol and/or high lipid blood test
- Have diabetes
- Have ever smoked or smoke now
- Have an inactive lifestyle
- Have a personal history of high blood pressure, heart disease, or other vascular disease
- Have trouble walking that involves cramping or tiredness in the muscle with walking or exercising, which is relieved by resting
- Have pain in the legs or feet that awaken you at night

## **Prevalence**

- PAD is a disease of the arteries that affects 10 million Americans.
- PAD can happen to anyone, regardless of age, but it is most common in men and women over age 50.
- PAD affects 12-20 percent of Americans age 65 and older.

## **PAD Treatments**

### **Lifestyle**

Often PAD can be treated with lifestyle changes. Smoking cessation and a structured exercise program are often all that is needed to alleviate symptoms and prevent further progression of the disease.

### **Angioplasty and Stenting**

Interventional radiologists pioneered angioplasty and stenting, which was first performed to treat peripheral arterial disease. Using imaging for guidance, the interventional radiologist threads a catheter through the femoral artery in the groin to the blocked artery in the legs. Then he or she inflates a balloon to open the blood vessel where it is narrowed or blocked. In some cases this is then held open with a stent, a tiny metal cylinder. This is a minimally invasive treatment that does not require surgery, just a nick in the skin the size of a pencil tip.

In many cases, interventional radiologists can open blocked or narrowed blood vessels caused by peripheral arterial disease or other conditions. For example, in some patients, high blood pressure is caused by blockage in the artery to the kidney, a condition known as renal vascular hypertension. Interventional radiologists can often treat blocked blood vessels without surgery. In most cases, hospitalization and general anesthesia are not required. There is no surgical incision ?just a small nick in the skin ? and no stitches are needed. Often, patients may return to normal activity shortly after the procedure.

### **Angioplasty and Stenting Definition**

#### **Balloon**

In this technique, the interventional radiologist inserts a very small balloon attached to a thin catheter into a blood vessel through a small nick in the skin. The catheter is threaded under X-ray guidance to the site of the blocked artery. The balloon is inflated to open the artery. Sometimes, a small metal "wire-like" tube or scaffold, called a stent, is inserted to keep the blood vessel open.

#### **Stent**

Balloon angioplasty and stenting have generally replaced open surgery as the first-line treatment because randomized trials have shown interventional therapy to be as effective as surgery for many arterial occlusions. In the past seven to ten years, a very large clinical experience in centers around the world has shown that stenting and angioplasty are preferred as a first-line treatment for more and more processes throughout the body.

### **Thrombolytic Therapy**

This treatment is used if the blockage in an artery is caused by a blood clot. Thrombolytic drugs that dissolve clots are infused through a catheter to eliminate the clot and restore blood flow.

## **Smoking and Vascular Disease**

Although most people are well aware of the risk of cancer from smoking, few people realize the damage smoking causes throughout the body's vascular system. Smoking damages the blood vessels and smokers are at risk for all vascular diseases including peripheral arterial disease, stroke, heart attack, abdominal aortic aneurysm and subsequent death.

## **Atherosclerosis ? Hardening of the Arteries**

Atherosclerosis, or "hardening of the arteries," occurs when cholesterol and scar tissue build up, forming a substance called plaque inside the arteries that narrows and clogs the arteries, causing decreased blood flow. Because atherosclerosis is a systemic disease, people are likely to have blocked arteries in multiple areas of the body. These people are at increased risk for heart disease, aortic aneurysm, peripheral arterial disease, stroke, renal hypertension and kidney failure.

## **Interventional Radiologists are Vascular Disease Experts**

Interventional radiology is a recognized medical specialty by the American Board of Medical Specialties. Interventional radiologists are board-certified physicians with extensive training in vascular disease diagnosis, management and treatment. Their board certification includes both Vascular and Interventional Radiology and Diagnostic Radiology which are administered by the American Board of Radiology. This training marries state-of-the-art imaging and diagnostic expertise, coupled with clinical experience across all specialties and in-depth knowledge of the least invasive treatments.

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