

# IN CIRCULATION

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## PERIPHERAL ARTERIAL DISEASE - THE SILENT DEBILITATOR

GAURAV LAKHANPAL, MD, FACC, RPVI

**P**eripheral Arterial Disease (PAD) in the lower extremities is the narrowing or blockage of the vessels that carry blood from the heart to the legs. It is primarily caused by the buildup of fatty plaque in the arteries, which is called atherosclerosis. PAD (defined as plaque buildup in arteries other than coronaries or carotids) can occur in any blood vessel, but it is more common in the legs than the arms.

### PAD Prevalence and Life Expectancy Data

Men and women are equally affected by PAD; however, certain races, such as African Americans, do have an increased risk of PAD. People of Hispanic origin may have similar to slightly higher rates of PAD compared to non-Hispanic whites. Approximately 8 million people in the United States have PAD, including 12-20% of individuals older than age 60. General population awareness of PAD is estimated at 25%, based on prior studies.

**Life expectancy is reduced 10 years in patients with PAD.** The mortality rate data indicates patients with PAD will expire at the following rates:

- 25% at 5 yrs
- 50% at 10 yrs
- 75% at 15 yrs

In summary, 75% of deaths are caused by cardiovascular events. The same risk factors are responsible for developing CV disease. **Hence, early diagnosis and treatment of PAD is of vital importance to prevent future CV morbidity and mortality.**

### Risk Factors for PAD

- Smoking
- High blood pressure
- Atherosclerosis
- Diabetes
- High cholesterol
- Older than age 60
- Younger than age 50 with diabetes and one additional risk factor

All blood vessels' combined length is close to 100,000 km (60,000 miles). Capillaries alone contribute for 85% of this length.

### PAD Signs and Symptoms

The classic symptom of PAD is pain in the legs with exertion, such as walking, which is relieved by resting. **However, up to 40% of individuals with PAD have no leg pain.**

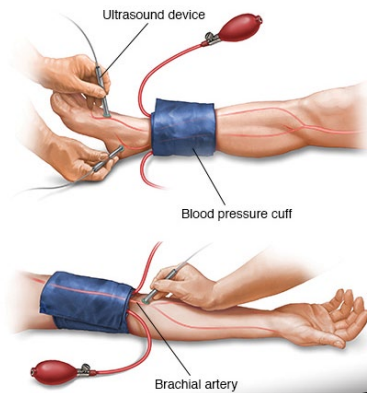
### Symptoms:

- pain, ache
- cramp with walking (claudication) can occur in the buttock, hip, thigh, or calf
- muscle atrophy
- hair loss
- smooth shiny skin
- skin that is cool to the touch especially if accompanied by pain while walking
- decreased or absent pulses in the feet
- non-healing ulcers or sores in the legs or feet
- cold or numb toes

### PAD Diagnostic Options

PAD is relatively easy to diagnose. The most common non-invasive diagnostic modalities are listed below. All can be performed in an outpatient setting.

1. Ankle Brachial Index:
  - a. Very easy to perform in any physician office setting
  - b. Correlates with the severity of the disease



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# PERIPHERAL ARTERIAL DISEASE - THE SILENT DEBILITATOR (CONTINUED FROM PAGE 1)

2. Pulse Volume Recording
  - a. Useful in patients with non-compressible vessels and to correlate the anatomical level of disease



3. Arterial duplex ultrasound:
  - a. Characterizes the plaque morphology, as well as, quantifies stenosis severity based upon velocity of blood flow in the vessel across the blockage

**You need to consume a quart of water each day for four months to equate to the amount of blood your heart pumps in one hour.**



4. CTA/MRA
  - a. More expensive diagnostic modality
  - b. Use of contrast dye and radiation is required

## Early Screening can Save Lives!

It is important for physicians to follow the screening recommendations by various societies and preventive task forces to reduce the underdiagnosis of the disease and increase early intervention.

Recent data suggests screening certain patients who normally would not be considered at risk by most physicians. According to the 2011 ACC/AHA practice guidelines, patients who meet the following criteria are at high risk for developing PAD and hence should undergo screening for early detection and subsequent treatment:

- Age <50 years with diabetes and one additional risk factor (smoking, dyslipidemia, hypertension, or homocysteinemia)
- Age 50 to 69 years with history of smoking or diabetes
- Age ≥65 years
- Known coronary, carotid, or renal atherosclerosis
- The presence of abnormal lower extremity pulses, or symptoms of claudication or ischemic rest pain

## Treatment Options

- **Risk Factor Modification**
  - Smoking cessation
  - Increased exercise regimen
  - Dietary changes
- **Medical Management**
  - Lower blood pressure
  - Lower cholesterol
  - Close diabetic management
  - Antiplatelet therapy
  - Statin therapy
- **Minimally Invasive Techniques**
  - Angioplasty
  - Stenting
  - Atherectomy
  - Thrombectomy
- **Surgical Interventions**
  - Bypass
  - Amputation

**Veins are not blue. They appear that way as only blue light can penetrate skin and reflect back to your eyes without being absorbed by skin.**

**Blood has a long road to travel: Laid end to end, there are about 60,000 miles of blood vessels in the human body. The hard-working heart pumps about 2,000 gallons of blood through those vessels every day.**

**It is scientifically suggested that walking at a fast pace for 3 hours or more at least one time a week can reduce your risk for heart disease by up to 65%.**

## NEW LAUREL LOCATION!

Center for Vascular Medicine is committed to providing the highest quality outpatient vascular services in convenient, friendly centers.

Dr. Michael Malone, a vascular surgeon, will be seeing patients weekly in Laurel. He also will provide assessment and diagnostic services.

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# THE ROLE OF OUTPATIENT-BASED VASCULAR LABORATORIES IN THE MANAGEMENT OF COMPLEX PATIENTS WITH NON-HEALING ULCERATIONS

MICHAEL D. MALONE, MD, FACS / KRUTI PATEL, PA-C

As technologies improve in the management of non-healing ulcerations, the role of out-patient vascular laboratories has become increasingly important in the management of complex patients. This article will focus on three groups:

1. Patients with arterial insufficiency or inadequate blood flow
2. Patients with venous insufficiency causing venous stasis and tissue breakdown
3. Patients whose ulcerations are a result of a combination of arterial and venous disease. Physicians must address both disease entities for healing to occur

The incidence of PAD, its early detection and appropriate management impacts the risk of ulceration formation and the prevention of amputations. In terms of the incidence of foot ulcers, ulcerations associated with diabetes mellitus are the most common cause of foot ulcers. Most of these ulcers are a direct result of loss of sensation secondary to peripheral neuropathy<sup>(1)</sup>. Approximately 15% of patients with diabetes will develop foot ulceration during their lifetime<sup>(2)</sup>. Venous leg ulcers are a prevalent and morbid disease that consumes considerable health care resources. In one study, costs varied from \$15,000 to \$71,000 dependent on other morbidities and duration of wound healing<sup>(3)</sup>.

## Treatment Options

The goal in treatment of non-healing ulcers is to alter the anatomy and correct any physiologic abnormalities. With arterial insufficiency, procedures attempt to improve and provide adequate arterial perfusion and oxygenation to allow for wound healing. Traditional open procedures include bypass surgeries (requiring autogenous or synthetic grafts) or endarterectomy procedures. These procedures are routinely performed in the hospital setting. Typically, they are more invasive and result in a prolonged post-operative course. In contrast, newer percutaneous procedures are minimally invasive and can be performed in the outpatient setting. Some of these include:

- Atherectomy: removes and debulks significant plaque formation in the arterial circulation
- Balloon angioplasty: alleviates narrowing in the arterial system
- Stenting: an option if there is still some residual narrowing after the aforementioned procedures are performed

In terms of venous ulceration, procedures can be divided into those which deal with superficial venous reflux and those which deal with reflux of the deep venous system.

1. Management of superficial venous reflux includes traditional venous stripping, ablation procedures (laser or radio frequency) or ambulatory phlebectomy.
2. Deep venous insufficiency is a bit more complex. The goal is to correct compression of the deep venous system either from anatomical compression or scarring from postthrombotic syndrome resulting after a DVT. Management includes the use of intravascular ultrasound (IVUS) to delineate the degree of compression. At this point, a plan can be devised and venoplasty and/or stenting can be performed.

## Summary:

The use of an outpatient vascular catheterization laboratory has revolutionized the care of the complex vascular patient with non-healing wounds. In the past, these patients would need to have an invasive open surgical procedure in the hospital setting with its prolonged perioperative recovery period. The longer period of recovery time negatively impacts patient satisfaction and healthcare costs.

## CASE 1

85 year old woman with ulceration of left ankle, lower extremity edema

PMH/Risk Factors:

- Rheumatoid Arthritis
- Hyperlipidemia
- Post-thrombotic Syndrome
- Peripheral Arterial Disease
- History of Left Lower Extremity DVT
- Procedures Performed: venogram, venoplasty, and venous stenting of left common iliac vein with wall stent

## Outcomes

Complete healing of venous stasis ulceration. In addition, the patient underwent an arterial evaluation and was found to have initially asymptomatic occlusion of the right superficial femoral artery. After the venous procedure was performed, the patient's ambulation improved. With increased walking, the arterial claudication symptoms of the right lower extremity were unmasked and the right lower extremity occlusion was treated successfully with laser atherectomy, angioplasty and stenting of the right superficial artery.



Pre Procedure



Post Procedure

## CASE 2

66 year old woman with non-healing ulcerations to dorsum of left foot and toes

PMH/Risk Factors:

- Arthritis
- H/O CVA
- Diabetes Mellitus
- Hypertension
- Obesity
- Procedures performed: diagnostic arteriogram; laser atherectomy and balloon angioplasty of left popliteal artery

## Outcomes

Complete healing of ulcerations to dorsum of left foot, left great toe and second toe.



Pre Procedure



Post Procedure

## References:

1. Allen, Gabriel and Molnar, Joseph. Medscape 11/6/2014
2. American Diabetes Assoc. Consensus development conference on diabetic foot wound care. 7-8 April 1999. Boston, MA.
3. Ma H, O'Donnell TF. The real cost of treating venous ulcers in a contemporary vascular practice. Oct2014 V2 Issue 355-361.

# VULVAR VARICOSITIES: A PRIVATE CONDITION OFTEN UNDER RECOGNIZED

VINAY SATWAH, DO, FACOI, RPVI

The presence of vulvar varicosities is not an easy topic to discuss with female patients. The condition can be a source of unnecessary anxiety and embarrassment. **The good news is that there may be a permanent solution to these unsightly veins that the Center for Vascular Medicine (CVM) can offer in the outpatient setting.**

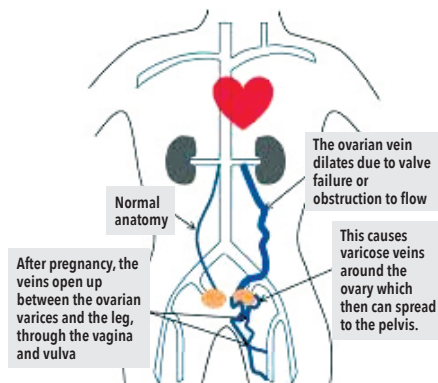
Vulvar varicosities are dilated veins found in the labia majora and minora and are more commonly in pregnant women as opposed to the non-pregnant population. While as many as one in ten pregnant women experience these troublesome veins, spontaneous improvement in the appearance of vulvar varicosities is typically seen within six to eight weeks post-partum. However, in some women these dilated veins may never resolve and only worsen with time and further pregnancies. When persistent and symptomatic, they may present with pelvic discomfort during walking, a sense of swelling, vulvar pressure, pruritis, pain, and dyspareunia (painful intercourse).

Anatomically, normal veins of the vulva have a rich network of communicating branches with veins arising in the wall of the pelvis, which also communicate and anastomose with the vasculature of the female organs. The venous drainage of the vulva is via the pudendal and perineal veins which then depend on competence of the ovarian, iliac and great saphenous veins. During pregnancy, the rise in estrogen and progesterone production causes venous dilatation. Furthermore, the increasing physical load of the enlarged uterus on the pelvic floor contributes to pelvic venous insufficiency and the resultant symptom-

atic varicosities. With each subsequent pregnancy, symptoms typically present earlier in the course of gestation and are more significant. The majority of varicose veins of the vulva are caused by reflux in the pelvic veins termed ovarian vein reflux and/or iliac vein reflux. Extension of varicosities into the medial thigh is also a common finding in patients with varicosities of the vulva.

After a thorough history and physical, a painless transcuteaneous pelvic venous duplex ultrasound is the method of choice for non-invasive diagnostic evaluation of the pelvic and vulvar venous system. The symptomatic patient may then undergo further invasive evaluation including a venogram, where contrast dye is injected into the veins under fluoroscopy.

With the diagnosis of ovarian vein reflux, a coil or chemical sclerosant can



be placed selectively into the ovarian vein resulting in closure of the vein with eradication of reflux in this vessel. Once the faulty pelvic vein is closed, the venous blood will be re-directed naturally into the healthier veins and improve the pelvic venous drainage. Following treatment of the pelvic venous insufficiency,



the patient returns for a follow-up pelvic ultrasound at six weeks to evaluate her response to interventional therapy. If the intervention has been successful, there is resolution of the pelvic vein reflux by ultrasound and the vulvar varicose veins may begin to decrease in size. A period of observation (six to twelve months) is typically warranted prior to moving on to sclerotherapy as many vulvar varicosities will improve significantly after correction of the pelvic vein reflux. When indicated, sclerotherapy may be injected either directly into the vulvar varicose veins or under ultrasound guidance pending their visibility.

Many women are hesitant to initiate a conversation on vulvar varicosities. **This issue is often discovered in the course of discussing symptoms of pelvic pain, pelvic congestion syndrome or varicosities of the legs. Soliciting this information is vital in order to properly direct a woman's evaluation and treatment.** As with venous insufficiency and varicosities of the lower extremities, this is a medical problem, not simply a cosmetic concern. Presenting the condition in such a manner can reassure a patient that her issue is not simply an embarrassment, but a medical disorder that warrants attention.

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To lose one pound of fat, a person has to burn roughly 3,500 calories.



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