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# Keeping In Circulation

the official newsletter of the Vascular Disease Foundation

## our mission

To reduce death and disability from vascular diseases and improve vascular health for all Americans.

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## If I Have an Ulcer on My Foot, Why Do I Need an EKG?

The twisting, burning pain in her right calf started up again as Ms. J hurried through the clinic parking lot for her doctor appointment. She stopped for a minute, leaning against a car to wait for the pain to ease. Lately the pain had been really slowing her down and was taking longer to go away. Ms. J just wished it to go away for good. Her primary care doctor told her that quitting smoking was essential in helping her circulation problems, and he also referred her to a vascular specialist.

The nurse checked Ms. J's blood pressure and weight and looked over her paperwork. Then she had Ms. J take off her shoes and socks and examined her feet. Ms. J had never noticed how purple her right foot looked when she was sitting down or that little blister on the end of her big toe. Then the nurse checked the blood pressure in her legs. No one had ever done that before!

The nurse explained that people have blood pressure in their legs as well as their arms and that an abnormal reading can be caused by a clogged artery slowing the flow of blood down the leg. Ms. J thought that made some sense. The nurse then told Ms. J that she would have an EKG before the doctor came in.

"But I'm here for my leg pain, not any heart problems," protested Ms. J. The nurse explained that the EKG is a screening test for the heart, just like the arm and leg pressure readings she had just done, or just like a blood test. That made sense to Ms. J. The pain in her leg was bad enough that she certainly would not want that pain occurring in her heart too!

*Continued on page 2*

## VDF Goes to Washington for National Campaign Launch

It's time to celebrate! The long-awaited launch of a national peripheral arterial disease (PAD) awareness campaign was finally unveiled!



Marge Lovell, RN and Alan Hirsch, MD, P.A.D. Coalition Co-chairs

*Continued on page 6*

## Foot Ulcer cont. from page 1

### Peripheral Arterial Disease and Coronary Artery Disease: What Is the Connection?

The nurse who examined Ms. J knew that the symptoms the patient was having were enough to check her for both peripheral arterial disease (PAD) and coronary artery disease (CAD). PAD occurs when one or more of the arteries that supply fresh blood to the muscles of the legs are narrowed or completely blocked by plaque.

Plaque is a fat-like substance composed of macrophages (a type of scavenger blood cell), cholesterol components, fibrin (a sticky protein), calcium, and other proteins. Small areas of plaque lodge in the arterial walls, usually in places where the artery bends, branches, or is stressed from pressure or injury. Over time, plaque areas can accumulate and become large enough to slow down or even stop the flow of fresh blood to the muscles in the leg below the blockage. When there isn't enough blood flow to the muscles to supply them with oxygen or sufficient nutrients to keep up with the needs of the muscles' activity (such as walking), pain such as cramping or burning occurs. The pain goes away when the activity is stopped because the muscles are resting and the supply of blood is able to keep up with the needs of the muscle. This is called intermittent claudication or simply *claudication*. As the flow of blood becomes less and the areas of blockage become larger, the muscles are deprived of nutrients and oxygen even at rest. Pain that interferes with sleep and requires medical attention is called *rest pain*. Attempting to sleep sitting up or with the leg dangling over the side of the bed may relieve some of the pain because gravity helps pull the blood through the arteries. Areas on the foot, especially the toes, are lacking in blood supply so much that a small injury does not heal, but becomes larger until it is a visible sore or ulcer. Bacteria can lodge in the sore and the body can't fight it off because there is not enough blood to that area to supply the germ-fighting blood cells that are needed.

While not all people with PAD have these "classic" symptoms, if you do exhibit these or other symptoms it is important to have your doctor test you for PAD.

CAD occurs when one or more of the arteries that supply fresh blood to the heart muscle become narrowed or completely blocked by plaque. Plaque in the arteries of the heart is composed of substances similar to the plaque in the arteries of the leg and develops in a similar way. When the heart muscle's need for oxygen and nutrients from the blood is greater than the flow of blood getting through the blocked area of the artery, pain occurs. The pain is commonly described as a squeezing or pressure sensation in the middle of the chest, also known as angina. There may be other symptoms as well, such as shortness of breath, pain in the arm or jaw, or extreme weakness. Angina occurs with activity such as carrying a heavy object or going up a flight of stairs, and then goes away with resting. As the blockage

increases in size, the angina occurs with normal activity, and sometimes even at rest. This progression of symptoms is similar to the progression of symptoms for PAD. Although PAD and CAD are similar, there are two important differences in the heart. One is that the heart muscle is always moving (beating) and does not rest in the same manner as leg muscles do. The second is that the heart arteries are smaller and fewer in number than the leg arteries, so blockages in the heart can develop at a different rate.

Development of plaque in the arteries of the leg (PAD) or the heart (CAD) is affected by the same things: age, high blood cholesterol from diet or inheritance, smoking, diabetes, high blood pressure, and lack of exercise. Other arteries can be affected as well, especially the carotid (neck) arteries that supply blood to the brain. Because all the arteries are interconnected, with the heart at the hub, arterial disease can develop in more than one place in the body at a time. Since the heart is the central pump where blood is circulated, it is important to ensure that it is working properly and to detect potential problems before damage is done, even before symptoms occur. People who have PAD have a 30% greater chance of also having CAD. Doctors who treat PAD will also be screening for CAD. Having an EKG is the first step in this evaluation. A stress test is sometimes done after the PAD symptoms have been relieved or before planned surgery for PAD. Lifestyle changes such as quitting smoking, walking, diet, and medical treatment of high blood pressure, diabetes, and high cholesterol should take place in all patients with PAD even if there is no evidence of active CAD.

Ms. J did in fact have both PAD and CAD. She is one of the nearly 12 million people in the United States who have PAD and the more than 15 million people in the United States with CAD.




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**About the Author:** Barbara Parness, RN, CCRN, MS, APRN-CNS. Barbara is a clinical nurse specialist with a cardiovascular group of 18 physicians based in a northwest suburban area of Chicago

# Non-Invasive Cardiac Testing

Name of Test	Performance	Purpose
<b>EKG (electrocardiogram)</b>	Patient is resting on exam table, leads from EKG machine placed on chest and extremities, recording done on graph paper.	Check heart rate, regularity of the heartbeat, and presence of previous damage to heart muscle. May also determine the presence of an ongoing heart attack or decreased blood supply to heart muscle.
<b>Echocardiogram</b>	Ultrasound of heart. Patient is resting on exam table, gel is placed on the left chest, and a flat probe obtains images of the heart in motion.	Assess function of heart valves. Check squeezing action of heart muscle. Measure chamber sizes. Can also be done with stress testing (treadmill or chemical) to check limitation of blood supply to the heart muscle by examining changes in the contraction of the heart walls.
<b>Stress testing (treadmill)</b>	Treadmill walking on an incline and EKG recording machine.	Evaluate heart muscle's response to exercise through changes in the rate, rhythm, and the EKG waveforms.
<b>Stress testing (chemical)</b>	Intravenous medication to imitate the effect of exercise for those unable to use a treadmill or who have a pacemaker.	Evaluate heart muscle's response to stress through changes in the rate, rhythm, and EKG waveforms.
<b>Myocardial perfusion imaging ("nuclear")</b>	Mild radioactive solution is injected through a vein. Images are obtained with a special X-ray camera.	Evaluate blood flow to heart muscle. Can be done alone or with exercise stress testing.
<b>Calcium score of heart arteries</b>	Specific type of CT scan.	Calcium deposits in the walls of the arteries are often associated with plaques in the arteries that can limit blood flow.
<b>CT angiogram of heart arteries</b>	CT scan with dye injected through a vein in the arm.	Imaging of blood flow through the heart arteries can locate areas and amount of blockage in the arteries that supply the heart muscle.
<b>Lipid testing</b>	Blood draw from vein in arm after several hours of fasting.	Measures level of cholesterol and other components of fats in the blood. Abnormal levels are associated with artery plaques.
<b>Blood pressure</b>	Inflatable cuff attached to a measuring instrument that measures contraction and relaxation of the heart.	Measurement of the stiffness of arteries and squeezing ability of heart muscle. High blood pressure is a risk factor for heart disease.

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# PAD: ONE WOMAN'S ROAD TO RECOVERY

When Barbara van Schaik, 76, was told she had Peripheral Arterial Disease (PAD) about a year and half ago, the diagnosis came as a relief. Barbara, an avid walker and hiker, developed a pain in her right leg that got progressively worse with walking. The pain took her from walking almost four miles a day to not even being able to get to the grocery store. Her first visit to the doctor was disheartening.

Thankfully, Claire Brockbank, Barbara's daughter, had been working with VDF in developing the PAD Coalition and its educational materials about PAD, and so she had learned about the disease.

"The doctor was dismissive and told my mom that she was just getting older and that she just had to learn to live with the pain," said Claire. "It really took her down when the doc told her that."

## What Is PAD?

Peripheral Arterial Disease (PAD) is a common disorder that occurs in the circulatory system. Sometimes it is referred to as peripheral vascular disease, claudication, hardening of the arteries, or just poor circulation.

For those with PAD, the arteries to the legs slowly become narrowed and then blocked as a consequence of age, smoking, high cholesterol, hypertension, or diabetes. As a result, blood flow to the muscles of the legs decreases, causing them to hurt and cramp during exercise. Having PAD greatly increases the risk for heart attack and stroke.

Some patients, like Barbara, have symptoms of claudication – a cramping of the leg muscles during walking, followed by relief when resting. Other symptoms may occur in those with more severe PAD: The skin may be cool, or become either reddish or blue, there may be a loss of hair, or skin ulcers and foot sores may develop that do not quickly heal. Patients may also experience pain at rest if they have severe PAD.

It was this knowledge of PAD that prompted Claire to encourage her mother to seek out another doctor and ask to be tested for PAD. Barbara did find a cardiovascular specialist in Montrose, Colorado, where she lives. The doctor performed a simple, painless, non-invasive test called an ankle-

brachial index (ABI). The test discovered a blockage in her upper right leg and Barbara was diagnosed with PAD.

If you are age 50 or less and have diabetes and one other risk factor (such as smoking, high blood pressure, high cholesterol, obesity, or diabetes), are 50-69 and have diabetes **and** smoke, or are over age 70, it is important to be tested. Usually, PAD can be diagnosed in your physician's office through a simple test with blood pressure measurements taken at the arms and ankles.

The treatment for Barbara's PAD was a minimally invasive angioplasty, a procedure for the surgical repair of an artery, and a 30-day regimen of an antiplatelet medication (Plavix®). An angioplasty is a balloon-tipped catheter that is passed through a blood vessel to the area that is blocked by atherosclerotic plaque. The balloon is inflated to compress the plaque against the wall of the artery, reopening the channel for the artery. The balloon is deflated and removed, and the artery repairs itself with the new, larger channel.

## Treatments

Treatment methods vary but can also be simple. Usually a program of exercise and use of specific medications such as cilostazol or Pletal® may be all that is needed. More severe PAD may require angioplasty or surgery. Although there is no "cure" for PAD, there are many ways you can prevent the progression of the disease. Good health practices, diet, exercise, and not smoking will



Barbara van Schaik and her dog, Cosmo

## **PAD** continued from page 4

slow the progression of PAD. Some medications can reduce its symptoms, and endovascular intervention can lessen the effect of the most severe consequences of PAD.

In Barbara's case, the endovascular procedure was very successful and she was up and walking around within one week. She is now back to walking four to five miles a day in preparation for a hiking trip she plans to take in the fall in northern California. Her doctor gave her the green light to go on the hiking trip just five weeks after her procedure.

"I was relieved once I knew what was wrong," said Barbara. "Once the doctors knew what to do it was resolved very quickly and now I'm looking forward to my hiking trip this fall."

While not all cases of PAD are so easily resolved, early detection and prevention are the keys. The risk factors that contribute to PAD are smoking, high blood pressure, high cholesterol, diabetes, age (persons over 50 with one or more risk factors are more susceptible), and a history of heart disease or high levels of homocysteine (an amino acid found in the blood).

These factors do not always have to be present, as in Barbara's case; she was at a very low risk for PAD but still had a blockage. Even if you have no risk factors, it is good to visit the doctor if you have any of the symptoms and ask for the ABI test.

"I have five children and have been married for 52 years," said Barbara. "I feel that my hiking trip to California is my reward for all the hard work I put into my recovery."

## *A Call to Action...on Blood Clots!*

The Surgeon General of the United States, Vice-Admiral Dr. Richard H. Carmona, concluded a two-day workshop on deep-vein thrombosis (DVT) and pulmonary embolism (PE) by committing to issue a Surgeon General's "Call to Action" to prevent and decrease the negative impact of DVT and PE on the American public. This is a powerful way to affect the treatment and care of those affected by venous clots. And that could benefit many people. It is estimated that up to 600,000 people are hospitalized each year for DVT and up to 200,000 deaths are due to PE. DVTs are blood clots that develop in the veins of the legs and sometimes the arms. A pulmonary embolism is when the blood clot dislodges and travels to the lungs.

Vascular Disease Foundation was privileged to participate in this workshop, which brought together experts from the science and medical communities at the National Institutes of Health (NIH) campus in Bethesda, Maryland, on May 8-9, 2006. The meeting was co-hosted by the Office of the Surgeon General and the National Heart, Lung, and Blood Institute of the NIH. The participants heard presentations about the prevalence of DVT, who is at risk, effective treatments, and best practices. The group discussed and helped set priorities on how to translate this information into medical care across the country.

Since the meeting, VDF has initiated contact with several of the groups at this meeting to further develop some of the priorities discussed at the workshop. VDF is committed to increasing awareness about venous disease and will work to build on the momentum of this workshop. It is hoped that this meeting marks the beginning of efforts that will make a difference in the lives of those affected by venous disease.



**Left to right:** VDF board member Robert McLafferty, MD; Vice Admiral Richard H. Carmona; VDF executive director Sheryl Benjamin; Rear Admiral Kenneth P. Moritsugu, MD, MPH

# VDF Goes to Washington: PAD



On Tuesday, September 19, VDF joined the P.A.D. Coalition in the national PAD campaign launch in Washington, D.C. The P.A.D. Coalition is a group of 45 member organizations made up of medical societies, voluntary health organizations, government agencies, medical device and pharmaceutical companies that have joined together to improve the lives of those with PAD. Over 100 people from the various member organizations attended this momentous occasion. VDF is proud to be one of the founding members of the Coalition.

The campaign, called “Stay in Circulation: Take Steps to Learn about PAD,” was created to provide education for the general public about PAD and was developed by the National Heart, Lung, and Blood Institute (NHLBI). NHLBI director Elizabeth G. Nabel, MD, kicked off the launch by stressing the importance of the campaign and the need to get information out to the general public about PAD.

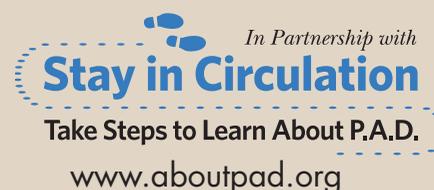


**Left to right:** Amy Pianalto, NHLBI communications staff; Elizabeth G. Nabel, NHLBI director; Rita Smith, PAD patient.

“Symptoms of PAD should not be mistaken for the inevitable consequences of aging,” said Dr. Nabel. “Early detection and treatment of PAD are important for staying in circulation and continuing to enjoy life to the fullest.”

A town-hall meeting of representatives from member organizations took place to update members on the Coalition’s progress thus far and to share plans for the future. As part of the Stay-in-Circulation campaign, additional materials were introduced, including fact sheets, posters, public service announcements, stickers, purple vinyl feet, and tool kits to spread the word about PAD in the community. Radio ads will be aired in many cities.

The NHLBI also unveiled a seven-minute patient DVD to help the general public learn more about PAD, its signs, symptoms, and risk factors. Many of these items are available for download from the campaign site [www.aboutpad.org](http://www.aboutpad.org).

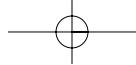


## Why the Need for the PAD campaign?

More than eight million Americans suffer from PAD—hardening of the arteries (also known as “atherosclerosis”) in the limbs, often the legs. PAD is caused by the same risk factors that lead to heart disease and is a serious disease that is treatable if found in time.

While PAD is a common and treatable disease that is on the rise among midlife and older Americans, it is still largely unknown, often unrecognized, and regarded by many as an inevitable consequence of aging.

“Generally speaking, an astonishing 25% of persons with undetected vascular disease will either have a heart attack, stroke, amputation, or die in five years,” said Sheryl Benjamin, executive director of the Vascular Disease Foundation.



# PAD Campaign Launch cont. from page 1

“While there is no cure for PAD, studies have proven that early detection and treatment can greatly enhance and prolong a person’s life.”

## Taking It to the Hill

Members from the Coalition’s Advocacy Committee went to the Capitol later in the afternoon to conduct a PAD briefing for legislators and their staff. The goal of the briefing was to raise awareness of the need for increased attention to peripheral arterial disease and to review legislative goals to improve early detection of the disease among at-risk Americans. Representatives from 35 Congressional offices participated.

According to Gwen Twillman, P.A.D. Coalition executive director, “This briefing provided an opportunity to educate legislators and their staff on the severity of PAD and its impact on the nation’s cardiovascular health. We feel the meeting opened the door to future discussions for legislative initiatives to improve the diagnosis and treatment of PAD and ultimately the quality of many lives.”

## A Call to Action

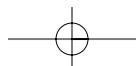
The one thing that was commonly expressed at the launch was the overwhelmingly strong need to get the message to the general public and to further educate the medical profession about PAD.

“All clinicians, hospitals, and health-care systems which provide care for individuals with PAD are very concerned when care is offered only when symptoms are already very severe. Millions of individuals suffer these symptoms and yet remain vulnerable to heart attack, stroke, amputation, or death at a time when effective treatments exist,” said Alan T. Hirsch, MD, chair of the P.A.D. Coalition, professor of epidemiology and community health at the University of Minnesota School of Public Health, and director of the Vascular Medicine Program at the Minneapolis Heart Institute and Abbott Northwestern’s Vascular Center, Minneapolis, MN. “We are certain that a well-informed public, with access to health-care providers who are prepared to provide these

*Continued on page 10*



**Left to right:** Alain Drooz, MD; Harvey Wiener, DO; Peter Sheehan, MD; Gwen Twillman, P.A.D. Coalition Executive Director; Karen Lui, RN, MS; Joshua Beckman, MD; Mike Frame; Heather Gornik, MD; Jerry Goldstone, MD; Diane Treat-Jacobson, PhD





VDF was honored to be part of the Vascular Interventional Advances (VIVA) conference with our inaugural Run for Your Legs...and Your Life 5K run/walk. What a big success! We send our thanks to the 280 registered runners who helped us raise \$12,750 toward increasing the public's awareness about vascular disease.

attendees quickly took the conference by storm as each exhibitor organization tried to encourage as many members as possible of its own organization to register. Boston Scientific won the competition, with Bard Peripheral, Cordis Endovascular, and ev3 close behind.

Runners/walkers were treated to a performance by Elvis impersonator Steve Connolly, a raffle, and a hearty breakfast under a perfect blue sky. The race took place at the Mandalay Bay Convention Center in Las Vegas and was part of the VIVA06 annual education course for vascular doctors, surgeons, and other medical practitioners.



**Pictured left to right:** Alain Drooz, VDF Board President; Debbie Hines; Krishna Rocha-Singh; Bruce Gray; Michael Jaff, VDF Board Member; Kenneth Rosenfield; and Steve Connolly as Elvis!

VDF board member Dr. Michael Jaff was VIVA's moderator, and he helped encourage all of the course participants to show their support for PAD awareness week and the national PAD awareness campaign launch, and to learn about VDF and the P.A.D. Coalition.



Out of the 280 race participants, the majority were VIVA participants. A friendly competition among

The morning of the race, Dr. Alain Drooz, VDF president, received Certificates of Commendation from the offices of both Nevada Senators Harry Reid and John Ensign.

Our thanks again to all of our runners/walkers and to all of the sponsors who helped make this inaugural race a great success: **Cordis, a Johnson and Johnson Company, ev3, Desert Springs Hospital Medical Center, Bard Peripheral Vascular, Diomed, W. L. Gore and Associates, Medical Media Communications, CV Therapeutics, 4Imprint,** and to the **Las Vegas Running Team** for organizing a great race.

# Sixth Annual Keeping In Circulation Event a Success



On Wednesday, August 30, VDF held its sixth annual Keeping in Circulation PAD screening just outside Denver, Colorado. Dr. Judy Regensteiner, Professor of Medicine for the University of Colorado Health Sciences Center, presented “PAD and You” to an audience of approximately 50 people, while Michael Podolak, M.D., C.A.Q. in Vascular and Interventional Radiology for Diversified Radiology of Colorado, P.C., discussed the latest PAD treatments.

Our thanks to both Dr. Regensteiner and Dr. Podolak for donating their time and sharing their knowledge with our participants.

In addition to Doctors Regensteiner’s and

Podolak’s presentations, there was plenty of information on hand from VDF, the Tobacco Coalition, and Sanofi-Aventis.

Participants were also offered a free ankle-brachial index (ABI) screening, which is often the first test used to detect the presence of PAD. The screenings were conducted by Dan Gautier, Susan Smith, Julie Mangelsdorf, David Jones, Ken Jarrell, and Maria Fishman.

Bottled spring water and nutritious snacks were provided by Whole Foods, and there was a giveaway to one of the City of Lakewood’s recreation centers. This year, the event saw a change in location to the Lakewood Heritage Center, which offered a self-guided tour around the center’s beautiful grounds, shopping in its gift shop and local artists’ exhibits.

VDF would like to thank our sponsors who helped make this event a success: **Sanofi-Aventis, Porter Adventis Hospital, Summit Doppler, Cardiovascular Research Center at the University of Colorado Health Sciences Center, Whole Foods, the City of Lakewood, Colorado School of Healing Arts, and Safeway.**

## IN THE NEWS

**Combined Federal Campaign.** Autumn is enrollment time for the Combined Federal Campaign (CFC) for federal employees and those in military service. Please consider supporting VDF programs by placing our official CFC campaign number #2527 on the pledge card. Please ask anyone you know who works for the federal government or the military to help us in this way.

**Free Vein Screenings.** During November, the American Venous Forum, in partnership with the American Vascular Association, will be offering free vein screenings for venous disease at several locations across the country. The Venous Screening Program includes a risk assessment for deep-venous thrombosis and duplex ultrasound screening for venous reflux and obstruction. For information or to see if there is a site near you, call **1-800-933-3200** or go to VDF’s Web site at [www.vdf.org](http://www.vdf.org) and click on the left tab “Sponsors” and then click on “American Venous Forum.”

**Attending AARP in Anaheim?** VDF will have an information booth at this year’s AARP national convention, Life@50+, to be held in Anaheim, California, on October 26-28. Board member Marge Lovell will give a stage presentation on “Facts About Circulation: What You Should Know.” If you are attending, be sure to stop by booth #401.

**Annual Fundraising Campaign.** Our annual fundraising campaign will be underway soon. We hope you will give generously to support the Foundation’s efforts to fight vascular disease and improve vascular health.

**Upcoming Meetings.** VDF will provide information at professional meetings this fall. Planned are the American Heart Association meeting in Chicago, the Veith Symposium in New York City, and the American College of Phlebology meeting in Jacksonville, Florida.

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## PAD Campaign Launch cont. from page 7

simple evaluations, can provide a fundamental first step in protecting the cardiovascular health, well-being, and independence of our community.”

“This campaign is a national ‘call to action’ to the public, as well as to physicians and health systems to now provide the effective care that saves lives of those with PAD,” said Coalition Vice-Chair, Marge Lovell, RN, CCRC, CVN, BEd, Clinical Trials Nurse at the London Health Sciences Centre in London, ON.

The P.A.D. Coalition would like to thank its sponsors for helping make this important initiative possible: **Cordis, a Johnson and Johnson Company, Bristol-Myers Squibb-Sanofi-aventis partnership, W.L. Gore, Medtronic, Cook, Biomedix, ev3 and Summit Doppler.**

For more information about the Coalition, please visit [www.padcoalition.org](http://www.padcoalition.org). For information about the Staying in Circulation Campaign, visit [www.aboutpad.org](http://www.aboutpad.org)

**Excellence In Care...**The Excellence In Care Award is a wonderful way to celebrate the accomplishments of a friend, family member, colleague, or special medical professional. To submit a tribute to be included in the next issue, send a note or e-mail along with a donation stating who you are honoring and why he or she deserves the recognition. Checks or credit card charges of any amount are accepted with a \$50 minimum. Be sure to identify the honoree’s name and address so we can let him or her know of this honor, as well as your name and address. This Award provides a meaningful, living gift by honoring a special occasion, significant accomplishment, or superb medical care.

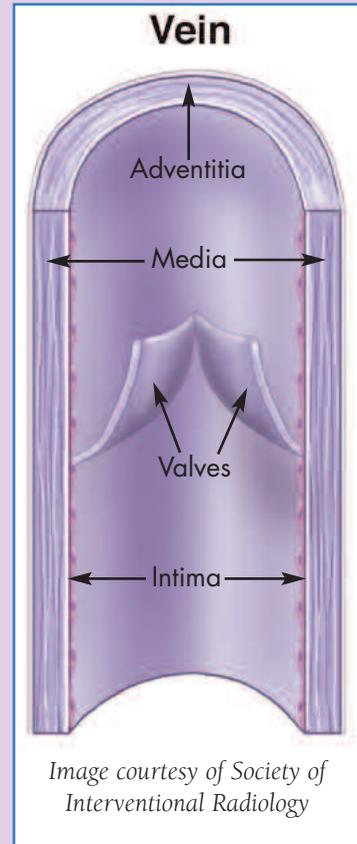
# Anatomy of . . . a Vein

Veins are the blood vessels that return blood to the heart. With the exception of the pulmonary veins, the blood that is returned is deoxygenated (that is, all of the oxygen has been used in the body and must be replaced in the lungs).

Veins, like arteries, have three layers: the intima, media, and adventitia. The intima is lined by a single layer of cells that allows for the flow of blood. Vein layers are much thinner than those in arteries and contain less muscle. In addition, veins collapse when empty. Flow in the veins depends upon whether the walls are collapsed, changes in breathing (respirations), the effects of gravity, and muscle activity around the veins themselves. One major difference between veins and arteries is that veins have valves. These are tissue-paper-thin leaflets within many veins that prevent the backflow of blood. Gravity tends to pull the blood back towards the lowest point, and valves stop this from happening. Valves are found most often in the extremities; the largest number are in the legs. Once the blood gets up to the veins in the abdomen, natural pressure changes and muscle action are enough to keep the blood flowing toward the heart. If the valves in the extremities do not work properly, individuals may develop varicose veins, swelling, skin changes, and ulcers.

Veins begin at the capillaries, which are the ends of the arterial system. They gradually become larger and larger. Branches combine and flow into the vena cava (the large vessel in the abdomen and the upper chest) to return the blood to the heart.

Damage to the intima of the vein can result in the formation of a blood clot. Other things that may cause or contribute to clotting are stagnant flow in the veins (stasis) and increased amounts of factors for blood clotting (a hypercoagulable state, also known as thrombophilia). As long as the venous system works, blood should return easily to the heart, where it is then sent to the lungs for oxygen and back out into the arteries by way of the heart.



**Correction:** In the previous issue, "Anatomy of an Artery," it is incorrectly stated that "most of the strength of the artery wall" comes from both the media and the adventitia. The correct information is that "most" of the strength of the arterial wall comes from the adventitia layer and that the media provides additional strength and support.

## Frequently Asked Questions

- Q.** In the last issue, flax was listed as an herbal that affects warfarin. Does this include flaxseed oil?
- A.** We found no reference that covers flaxseed oil. It would seem quite possible that it too would affect warfarin. Be cautious when you take flaxseed oil and have your health care provider monitor your blood coagulation rate (INR) level closely for a while.
- Q.** Is it more successful in the long term to use an artery or a vein from the arm or leg when having vascular bypass?
- A.** Vascular surgeons usually prefer to use a vein when doing a bypass in the leg for PAD or critical-limb ischemia. Most often the saphenous vein in the leg is used. If the saphenous vein is not available or not usable, the cephalic or basilic veins from the arm may be used. Because veins have a natural resistance to clot formation, they have long-term success rates that are superior to prosthetic grafts for leg bypass.

If the replacement is for the aorta (the large artery from the heart to the legs) for an aneurysm or PAD, then a prosthetic graft is required because of the larger diameter of the aorta. With the high flow rates in the aorta compared to leg arteries, prosthetic grafts are preferred, even though they are more susceptible to clot formation than using one's own veins.



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## November is Diabetes Awareness Month

People with diabetes are at greater risk for PAD and some other vascular diseases. In fact, one in four persons over the age of 50 with diabetes has PAD. The American Diabetes Association (ADA) estimates over 18 million Americans have diabetes, yet as many as one-third do not know they have it. The ADA and other diabetes organizations encourage the public to learn more about diabetes and the risks associated with the disease by offering community programs and information throughout the month. To find out what is available in your community and to get information about managing diabetes effectively, call 1-800-DIABETES, go to the ADA's Web site ([www.diabetes.org](http://www.diabetes.org)), or go to VDF's Web site at [www.vdf.org](http://www.vdf.org) and click on the left tab "Links" and then click on "Diabetes."

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