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Manish Mehta, MD, MPH, Center for Vascular Awareness, Albany, NY
The Spectrum of Vascular Medicine

In the United States, we are entering an unprecedented era of changes in our health care system. Although these changes appear daunting to consumers, the silver lining in the challenges ahead is an ability to redefine personal control over our health. The potential impact on health care delivery advantages to patients could be far-reaching. Current socioeconomic conditions have started to move the health care pendulum in a direction that will encourage personal control and accountability. This could be the most critical driver that changes the status quo—years of undiagnosed and far-too-often neglected risk factors that start early in life and have dire consequences leading to significant disability and costs in later years!

We have one of the most sophisticated health care systems in the world, and in the past decade we have witnessed extraordinary advances in vascular health. Unfortunately, even today, the methods of predicting which patients might develop advanced vascular disease remain rudimentary; much work is currently underway. In the not-too-distant future, it is likely that genomics (genetic mapping) will help us identify patients at risk for developing various vascular diseases. This development would be a leap forward in our ability to appropriately strategize targeting risk factors early, well before they lead to irreparable damage.

Ladies and gentlemen, fasten your seatbelts, as we enter the era of personal control and accountability. Vascular disease can often be elusive and difficult to diagnose by symptoms alone. The risk factors for developing vascular disease are similar to those for developing heart disease. Collectively, heart and vascular disease have become the single largest cause of disability and death. In this issue of V-Aware, we are proud to introduce two new forums: “The Pulse” which is a case-based feature that provides perspectives from the operating room, and the “Vascular Nurses’ Station,” giving us a glimpse into the everyday world of vascular nursing.

This issue starts with a focus on tackling atherosclerosis head-on, as Dr. Mark Tallman provides insights into risk factor modifications that have an impact on atherosclerosis. Next, I focus on a discussion on healthy vascular living. Dr. Paul Kreienberg teaches us how to optimize vascular screening for high-risk patients. Dr. John Rundback, world renowned for his renovascular work, discusses the rapidly evolving evidence and technology in his article on state-of-the-art renal intervention. Next, Dr. Chin Chin Yeh shares perspectives from the operating room in “The Pulse.” Recently, Albany Vascular International Academy presented to us the opportunity to develop collaborations with vascular physicians from across the globe, and Dr. Philip Paty recounts his recent experience of traveling to India. We have the privilege of understanding the patient’s perspective, as Catherine shares a personal vascular patient’s story that started with something as simple as hypertension. Finally, Nurse Marie Rossi provides a panoramic view from the “Vascular Nurses’ Station.”

I hope you enjoy this issue of V-Aware. Previous issues can be found on our website, www.vaware.org. As always, we look forward to your comments and suggestions. Please feel free to write to us at info@vaware.org.

Warmest regards,

Manish Mehta, MD, MPH
President and CEO of the Center for Vascular Awareness, Inc., Albany, NY
The Greek word, *athera*, translates to “a lump of gruel.” *Sclerosis* means “to harden.” When the terms are combined, they convey an accurate picture of atherosclerosis: hardened “gruel” deposited in artery walls.

The location within a person’s body where the atherosclerotic process has become detected or is symptomatic is described most often by the affected part. Coronary artery disease (CAD), peripheral vascular disease (PVD), and cerebrovascular disease are simply different terms for the same problem: atherosclerosis of a particular arterial bed within the body.

**THE PROCESS**

Inflammation is the body’s fundamental mechanism to cope with insult or injury. Virtually every disease process that can affect a human being may be defined by the inflammatory response that has been evoked and the consequences of that response. The body’s intention is to heal the site where the injury has occurred. Inflammation, however, is incredibly powerful, and unleashing it most often leads to adverse consequences.

Atherosclerosis is the end result of the body trying to heal an injured arterial vessel.

Your arteries are not inert conduits that permit blood to flow from your heart to the capillaries and then to your veins—they are living body parts. Arteries are three layers thick, and the process of atherosclerosis begins at the intima, the innermost layer of the artery that is in contact with the blood flowing through it. The most critical part of the intimal layer of an artery is the endothelial cell. The atherosclerotic process begins when these cells are injured or if their function is impaired. Endothelial cells are responsible for maintaining the health and normal function of an artery.
Endothelial cells also maintain the normal structural integrity of the artery by regulating the chemistry around them. The layer of endothelial cells is like a Teflon shield that prevents the elements within the blood and within the vessel wall itself from interacting, normally preventing the inflammatory response that culminates in atherosclerosis.

If the endothelial layer of the artery can be thought of as Teflon, the layer immediately beneath it (referred to as the subendothelial region) can be compared to felt fabric. If the sub-endothelium becomes exposed to blood elements, the process of inflammation commences as the cells and blood elements behave like sticky Velcro balls attaching to felt.

The final players in this analogy are the cells living in the neighborhood of the endothelium called monocytes, macrophages, and fibroblasts. They are the members of the “inflammatory band,” and they are eager to play—very loudly. The endothelium keeps them chemically in a harmonic balance, unless injury occurs.

INJURY AND INFLAMMATION

Injury to and inflammation of an artery can come from many directions: for example, eating a poor diet that is high in fats and carbohydrates; or having high cholesterol, unrecognized or poorly controlled hypertension, or diabetes. In many patients, a combination of factors adds up over decades of endothelial maltreatment leading to atherosclerosis. Your genes surely play a large role in developing atherosclerosis, but it’s what interacts with your genes (or what doesn’t) that often controls the extent of the effects that atherosclerosis will have in your body.

It bears emphasizing that the greatest controllable evil to the endothelium is smoking! The consequences of cigarette use can be best compared to the act of taking a razor blade and running it directly over the endothelium. Not only do the chemicals that reach the artery from cigarette use scrape off the endothelium, they also make the platelets in your blood more active and likely to congeal at places of injury.

Atherosclerotic plaques can be soft (meaning that they are rich in fats and inflammatory cells) or hard (meaning that they are scarred and full of fibrous tissue). Softer plaques are “younger” generally and very dangerous; if a soft plaque breaks, it can often lead to a vessel abruptly clotting off when the platelets they attract all show up in a hurry. Such plaques have been present for a long time, but not long enough for scar tissue to be deposited. Rupture of such a plaque is often the cause of heart attacks in relatively younger patients.

Hard plaques are “older.” To become hard requires a more prolonged period of inflammation, which encourages the body’s scab-forming cells (the fibroblasts) to lay down a microscopic scab. Such plaques are usually observed in middle-aged and older patients who may have atherosclerosis in any portion of their body.

SMOKING CESSATION

In the fight against atherosclerosis, the best plan is to control what you can, and treat what you should. Based on current rates of use, cigarettes will cause 1 billion deaths in the 21st century. There is no defense for cigarette use. There are no physical benefits to cigarette use. Quit! Quit yesterday! Do whatever it takes. Use available aids, prescriptions you can obtain, and whatever other support you can get, such as the New York State Smoker’s Quit Line.

If you’re living with a significant other or spouse who smokes, know that quitting together has been clearly shown to heighten success rates for both parties. Identify smoking for what it is for you. For some people, smoking is primarily a nicotine addiction. For all smokers, it is a behavior that has become ingrained. Try identifying your rituals (for example, making a phone call and lighting up, etc.) and alter the pattern of how you do things. Change your routine. For some, quitting is very hard. For all, quitting is the nicest thing you can do for your endothelial health. Smoking is something you can control 100%.

(article continues on next page)
KNOW YOUR RISK
Patients who never see a health care provider are doing themselves a disservice when it comes to detecting atherosclerosis. Measuring blood pressure, lipid profiles, and fasting blood sugar is easy and reveals much. Most of the traditional risk factors we associate with CAD come from data obtained in the middle of the 20th century from the residents of Framingham, MA. A project was started by the Harvard School of Public Health to assess the habits of a large number of people from that New England town. Generations have been followed, and these population data are the basis for our advice today regarding atherosclerosis prevention. If you search the Internet for “Framingham Risk Calculator,” you will find a tool that can calculate your 10-year cardiovascular disease risk.

DIET AND ACTIVITY
The North American/European diet most of us have been raised on is inflammatory to the arterial endothelium and interacts with our genetics to promote the development of hypertension (high blood pressure), diabetes, and hyperlipidemia (high cholesterol). You may be among the many people who have interpreted the word “diet” as an acronym for “do interventional eating temporarily.” A proper diet is a permanent lifestyle choice based on individual needs and knowledge of your family history and your own medical condition(s). There are no miracle diets, and continuing to pursue one is simply a waste of time and energy. The fad diets that abound may lead to rapid and unhealthy weight loss and are often followed by rebound weight gain when one returns to one’s old habits. The best suggestion is to eat a healthy diet rich in fiber and minerals and low in trans-fatty acid. Protein is important and should be lean. The American Diabetes Association and American Heart Association have excellent web-based resources for patients and also publish cookbooks that many people find helpful.

Along with the obesity epidemic in the United States, there is also an epidemic of physical inactivity. The current recommendations from the American Heart Association and the Centers for Disease Control and Prevention call for at least 150 minutes per week of moderate intensity activity such as walking at a brisk pace. The Centers for Disease Control and Prevention also recommend strength training of all major muscle groups twice weekly. Again, their websites are very helpful (www.cdc.gov and www.aha.org). Eating healthy foods and remaining active will minimize the chances of developing atherosclerosis, hypertension, hyperlipidemia, and adult-onset diabetes.

HYPERTENSION AND HYPERLIPIDEMIA
The shearing effects of hypertension on the arterial endothelium promote atherosclerosis. Patients diagnosed with hypertension, defined as a systolic blood pressure of 140 mm Hg or more or a diastolic blood pressure of 90 mm Hg or more, should be treated with diet and exercise in the absence of other conditions, most notably diabetes. In patients with diabetes, hypertension needs immediate medical treatment. For individuals with hypertension that persists despite lifestyle changes, medical therapy with a single medicine or combination of drugs is suggested. An optimal blood pressure is 120/80 mm Hg or less.

In patients without diabetes, the target is a reliable pressure of 130/80 mm Hg or less. In patients who have diabetes, the goal is 120/80 or less.

Hyperlipidemia is also a major risk factor for the development of atherosclerosis, and all adults should know their lipid profiles. Diet and exercise are first-line therapy for elevated cholesterol unless a patient has diabetes or multiple other risk factors for CAD. The current optimal total serum cholesterol level in a patient...
without diabetes is 200 milligrams per deciliter (mg/dL) of blood. The National Heart, Lung, and Blood Institute launched the National Cholesterol Education Program (NCEP) in 1985 (now in its third revision referred to as the NCEP III). There are subgroups of patients who should receive medical therapy for hyperlipidemia including individuals with diabetes and chronic kidney disease or PVD. The preferred treatments are members of the drug family known as **statins**. The goal in these patients is a low-density lipoprotein of less than 100 mg/dL.

It should be noted that the NCEP III has not been updated since 2004. The medical literature on this topic abounds with suggestions that the NCEP III guidelines are probably not aggressive enough on when to initiate medical therapy for hyperlipidemia. For this reason, many physicians have been offering drug therapy earlier and to a broader range of patients than the NCEP III calls for currently.

**DIABETES**

For several years now, diabetes has no longer been considered a risk factor for CAD. Diabetes is a disease state, and CAD is presumed to be present; it is the leading cause of death in diabetic patients. The guidelines for the management of hypertension and hyperlipidemia in patients with diabetes are identical to those for managing patients with known heart disease. Diabetes frequently occurs in the setting of hypertension. In a patient with diabetes, hyperlipidemia is presumed to exist, and drug therapy is suggested regardless of the patient’s actual cholesterol values at baseline. Controlling diabetes makes controlling hypertension and hyperlipidemia easier. Although intuitive, science has not shown that tightly controlling diabetes prevents CAD and PVD complications. Science has shown that controlling diabetes is most beneficial in small vessels, such as those of the kidneys and retina. A cardiologist should follow all diabetic patients periodically.

**ALCOHOL INTAKE**

There is very clear evidence that moderate alcohol use of any type (defined as two drinks per day for men and one per day for women) is associated with a reduction in death from CAD. This situation is a slippery slope because some patients should not drink for social reasons, and others have medical problems that will be potentially worsened by alcohol intake. The latter can be true of patients with hypertension, hyperlipidemia, and diabetes. As long as a person has no medical or addiction-related reasons or personal reasons to avoid alcohol, moderate use may help to reduce atherosclerosis.

**HOW TO SCREEN**

In a new house, when one turns on the faucet, the water pressure is normal. After a certain number of years, however, no home has normal pipes. The same concept applies to the heart. When a patient has a stress test that is normal, it implies that the blood flow to the heart can be increased to meet the extra demand. In no way does this mean the arteries are normal. That means generally, if CAD is present, it doesn’t limit flow, and that is prognostically a good thing.

Calcium scoring (CS) can give an estimate of how extensive a patient’s arterial disease burden is and has been scientifically shown to be superior to any blood test currently touted to detect CAD. The test is based on the observation that where inflammation is extensive, the body tends to deposit calcium. This process is the hardening of the artery. A score of 0 is optimal, a score of 10 to 100 confers low risk, 101 to 400 indicates moderate risk, and patients with scores of more than 400 have extensive disease burden and are considered at high risk for major cardiac events. A patient with an excellent stress test result and a CS of 0 is very different from a patient with an excellent stress test result and a moderate or high risk CS.

**PROTECT YOUR ARTERIES**

Heart and vascular disease remain the leading causes of death in adults, and most of those deaths are due to atherosclerosis. The inflammation that occurs is a response to injuring the most important cell of the arterial wall, the endothelial cell. The healing response to such an injury ultimately leads to changes in the vessel wall that can trigger acute events such as sudden heart attack and death or more delayed events such as PAD and stroke. You cannot control everything about this process, and there clearly is a genetic predisposition in some patients to develop atherosclerosis. You can control many things that interact with your genetic makeup, however (eg, through smoking cessation, proper diet and exercise, and treating medical conditions you are aware of via routine medical care). If you can view your arteries as being a vital body part and something you can try to protect from inflammatory injury by treating them well in the ways I have previously suggested, then you will be well on your way to tackling atherosclerosis head on.

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**Ask Your Doctor**

1. What are my blood pressure, lipid profiles, and fasting blood sugar levels?
2. Do I have any medical problems that will be made worse by alcohol?
3. Should I have a calcium scoring test?
Taking steps to lower risk for vascular disease is crucial for individuals of all ages especially baby boomers. By 2015, the U.S. Census reports an expected 87 million people aged 55 and older, up from 67 million in 2005.

Since vascular disease primarily affects seniors, the number of vascular disease cases is expected to rise dramatically. The vascular system is made up of arteries and veins that carry oxygen-rich blood throughout the body to the vital organs, the brain, and the legs. As we age, our arteries tend to thicken with a buildup of plaque and cholesterol, get stiffer, and narrow. When blood flow is restricted, vascular diseases such as carotid artery disease (CAD) can lead to stroke; peripheral artery disease can lead to problems walking and in the most advanced cases, foot ulcers, gangrene, and possible amputation; and abdominal aortic aneurysm can result in death if not treated early.

The five lifestyle modification practices highlighted below are not new. By implementing a few if not all the practices, prevention of vascular disease or reduction of recurrent cardiovascular disease (CVD) events can be reached.

**SMOKING CESSATION**
Smoking cessation is perhaps the most powerful of healthy lifestyle changes. Tobacco use ranks highest on the list of preventable causes of death worldwide. For example, people who smoke 20 cigarettes per day have a risk of heart attack that is six times that of a nonsmokers. Smoking cessation begins to lower CVD risk within a matter of months of quitting. In just 5 to 5 years, the CVD risk in a former smoker decreases to that of a nonsmoker.

Stopping tobacco use is difficult at best and can often take multiple attempts. Don't be discouraged. There are drugs such as Chantix (varenicline, Pfizer, Mission, KS) and weaning tools such as NicoDerm patches and Nicorette gum (GlaxoSmithKline, London, UK). There are also many sources of counseling and support through the American Heart Association, church groups, hospitals, and other organizations. Remember that weaning tools still have the negative effects of nicotine on blood vessels and are not totally free of CAD risk.

**BLOOD PRESSURE CONTROL**
Exercise and weight control are important components of any program for blood pressure control. First, high blood pressure has to be recognized through blood pressure measurement at screening fairs, drugstores, at home, or as part of a routine physical exam. Thirty minutes of exercise a day, five times a week at least can help control blood pressure as well as weight—start slowly and work your way up. Diet is also a mainstay of blood pressure control with special emphasis on sodium intake. Nutrition awareness is a big help here.
Processed foods, soups, snack foods, and diet salad dressings are all very high in sodium and need to be avoided or used in limited amounts. Salt is one of man’s earliest preservatives and is an acquired taste, but other spices can substitute.

**EAT HEALTHILY**

Major risk factors leading to atherosclerosis are hypertension, diabetes, obesity, and high cholesterol, all of which are profoundly affected by our diet. It has been traditional knowledge for generations that a healthy diet is associated with better health.

**Protect with produce**

Scores of studies show the more fruits and vegetables you eat, the less your likelihood of developing vascular problems. Why produce protects the vascular system is unclear. Fruits and vegetables are rich sources of vitamin C and potassium, two nutrients that are especially associated with improved endothelial function. Or it may be that a diet rich in produce leaves less room for unhealthy substances. Don’t rely on individual supplements of these nutrients, however, as that has been shown to be ineffective or even harmful. Instead, when choosing or planning meals, aim to load half your plate with fruits and vegetables.

**Slash sodium**

Limiting excess sodium seems to keep blood vessels healthier. All people over the age of 50, all African Americans, and anyone who already has high blood pressure, diabetes, or kidney disease are urged to keep daily sodium intake to no more than 1,500 milligrams. Everyone else should strive for no more than 2,300 milligrams a day. The best ways to achieve these targets is to eat fewer processed foods such as canned, frozen, or ready-to-eat convenience or fast foods, and to fill your salt shaker with herbs and spices rather than salt of any type.

Plus, read the Nutrition Facts labels on food packaging for sodium content and choose items with lower numbers.

**Reduce sugar intake**

A diet high in sugar and refined carbohydrates (eg, white bread) has in recent studies shown to negatively affect lipid profiles—it lowers good cholesterol, increases bad cholesterol, and elevates triglyceride levels. The popularity of sugar and refined carbohydrates has contributed to the obesity epidemic in the United States and the rise of the metabolic syndrome, both of which are major risk factors for atherosclerosis and vascular disease. Carbohydrates raise blood sugar levels and trigger the release of insulin. A diet high in refined carbohydrates has the effect of causing an exaggerated insulin release, which is associated with insulin resistance and the development of type II diabetes. A low-glycemic diet consisting of whole grains (complex carbohydrates), fruits and vegetables, and legumes (beans, peas, and lentils) can counteract the development of insulin resistance. Excellent sources of complex carbohydrates are whole-grain breads, oatmeal, and brown rice. The American Heart Association recommends that people consume only 5% of their daily calories as added sugar.

**Antioxidants**

Antioxidants are natural substances that exist as vitamins, minerals, and polyphenols, among others. Many antioxidants are identified in foods by their distinctive colors: the deep red of cherries and tomatoes; the orange of carrots; the yellow of corn and saffron; and the blue-purple of blueberries, blackberries, and grapes. The most well-known compounds with antioxidant activities are vitamins A, C, and E; beta-carotene; the mineral selenium; and the compound lycopene.

Antioxidants help prevent disease by blocking free radicals, a byproduct of oxygenation that causes cellular damage that leads to the development of atherosclerosis. An increasing body of evidence points to beneficial effects from the antioxidants present in grapes, dark chocolate, blueberries, and tea on cardiovascular health.

**Watch your waistline**

Undesirable weight gain has been linked to increases in arterial stiffness. Less supple arteries lose their ability to function as needed. Data show that as visceral fat (popularly known as belly fat) increases, so does stiffening of the arteries. It is thought that excess body

(article continues on next page)
fat creates a series of processes in the body that disrupt vascular structure and function. Knowing your waist measurement (via the aid of a tape measure) is a better harbinger of risk than paying attention to your body mass index alone. Cutoff points for waist size include keeping to 35 inches or less for women and less than 40 inches for men.

**MAINTAIN GOOD CHOLESTEROL LEVELS**

High cholesterol is one of the major controllable risk factors for coronary heart disease, heart attacks, and stroke. When too much bad cholesterol (low-density lipoprotein) circulates in the blood, it builds up as plaque in the arteries. This buildup causes narrowing or stenosis, stiffness, and endothelial dysfunction leading to vascular disease and its complications. Saturated fats and cholesterol are primarily derived from animal fats contained in red meats, dairy products, and processed foods enriched with partially hydrogenated fats. Limiting how much saturated and trans fats you eat is an important step to reduce your blood cholesterol and reduce your risk of vascular disease. Saturated fats should constitute less than 7% of your total daily calories (140 out of an average 2,000-calorie-a-day diet), and trans fats are best avoided completely. Dietary cholesterol should be kept to less than 300 mg per day for healthy adults and less than 200 mg per day for adults with elevated cholesterol.

It’s important to note that not all fats are detrimental, and many are actually beneficial to your vascular health. Monounsaturated fats, which are found in plant products such as olive oil or avocados, and polyunsaturated fats found in nuts and seeds, are beneficial to your vascular health and help lower your total blood cholesterol. Also remember that all fats are high in calories and thus should be consumed in moderation. Lastly, fish is an excellent alternative to high-fat meats. Many types of fish are rich in omega-3 fatty acids, which can reduce levels of another “bad” blood fat called triglycerides. The highest concentrations of omega-3 fatty acids are found in cold water fish such as salmon, mackerel, and herring. Other sources are flaxseed, walnuts, soybeans, and canola oil. If you are allergic to fish or just can’t meet that weekly goal, ask your doctor if it is safe for you to take a fish oil supplement. Look for a brand that contains a combined total of 500 to 1,000 milligrams of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).

**EXERCISE REGULARLY**

Not only does exercise help keep weight in check, it also provides additional perks for blood vessels and seems to keep arteries less stiff. Exercise may help by keeping arterial blood pressure from increasing. Or it may increase production of nitric oxide, a substance produced in blood vessel linings, which helps to dilate arteries and prevent fatty deposits from sticking to vessels.

So, how much exercise do we need? The first Surgeon General guidelines were published in 1996. The recommendation was for 30 minutes of “moderate” physical activity at least 5 to 6 days per week, but preferably every day. Recommended activities included swimming, brisk walking, cycling, and even higher-intensity house and yard work. Given the constraints of modern work schedules, recommendations were made to pick activities that are easily accessible, are safe and enjoyable, and have few negative consequences such as injury, peer pressure, or poor self-identity.

Most important, any significant change in activity level or exercise should be reviewed with your physician before you begin. Care should be taken to avoid musculoskeletal or overuse injuries, especially early in a program. Any plan should include stretching and exercises to increase flexibility.

**EARLY DETECTION**

If you are diagnosed with vascular disease, early detection can decrease the risk of treatments and improve the length and quality of your life. There are noninvasive exams that can determine if there are blockages in veins or arteries or if there is an aneurysm formation in the aorta. So, staying vigilant about reducing risk factors and having regular checkups with your primary care physician and vascular specialist are important.
Vascular Screening for HIGH-RISK PATIENTS

Screening tests are used to determine whether an asymptomatic individual has an undiagnosed disease or illness.

There are rigorous screening programs in place for many conditions in current medicine. Screening programs such as colonoscopies for colon cancer, mammography for breast cancer, and prostate-specific antigen testing for prostate cancer are but a few of the tests in widespread use for disease detection. You may ask why we screen for these diseases and not others. The answer to this question depends on many variables. There are two major objectives of any screening program: (1) to be able to detect the disease in an asymptomatic state and thus be able to intervene before signs and symptoms of the disease present and (2) to identify risk factors that can be adjusted or treated to prevent serious manifestations of the disease.

In order to fulfill these objectives, several criteria must be met. The disease process should represent a significant health problem, that is, a common condition with significant morbidity and mortality. The disease should also be treatable with early prevention nullifying the significant risk of the disease. The screening test for the disease must also be safe, available to population at risk, have the ability to detect asymptomatic disease in a high proportion of individuals, lead to improvements in patient outcomes, and be relatively inexpensive.

THE PAD MODEL
How do these criteria apply to the diagnosis and treatment of vascular disease? There is no doubt that screening for and treatment of heart disease is beneficial, however, little is discussed regarding the screening for any intervention on atherosclerosis (hardening of the arteries) in the periphery, particularly the lower extremities. Let’s examine peripheral arterial disease (PAD) in the context of a disease we might screen for.

Is PAD a commonly occurring and significant health risk?
As many as 12 million Americans are affected by PAD, and an average of $5,955 is spent per PAD patient annually. Roughly one in 16 patients older than 40 years of age in the US has PAD. This disease confers a two- to threefold increased risk of cardiovascular disease morbidity and mortality (ie, stroke, heart attack, death). Beyond these significant health risks, people with PAD have significant functional impairment and a lower quality of life in general than age-matched cohorts.

Ankle Brachial Index (ABI) and Pulse Volume Recording (PVR) measurements for diagnosing PAD.
What are the identifiable risk factors for PAD that can be adjusted to prevent serious manifestations of the disease?

• **Diabetes mellitus.** Diabetes is a strong predictor for the presence of PAD. In fact, for every 1% increase in hemoglobin A1c (a marker of blood sugar control), there is a 26% increased risk of PAD. Tight blood sugar control becomes paramount to prevent manifestations of the disease.

• **Smoking.** More than 80% of patients with PAD are current or former smokers. Smoking increases the risk of lower extremity atherosclerosis four- to sixfold. Smoking cessation has been shown to have a mitigating effect on the progression of vascular disease. A multitude of therapies are available to facilitate cessation.

• **High cholesterol.** Control of elevated cholesterol has been shown to slow disease progression. In some large trials, the use of statin medications (drugs that lower cholesterol) has been shown to decrease the onset of symptomatic vascular diseases in at-risk populations. The goal for patients with PAD should be treatment to maintain an LDL level < 70 mg/dL.

• **Hypertension.** Control of blood pressure decreases the development and progression of vascular disease. Once PAD is diagnosed, the target for blood pressure control becomes <130/80 mm Hg. Maintaining a healthy blood pressure has been shown to decrease the incidence of stroke and heart attack.

• **Age.** Although not a controllable risk, age certainly is a factor. The prevalence of PAD increases with age. Among individuals older than 85 years of age without a history of heart disease or stroke, about 30% of men and 40% of women will have PAD. The prevalence rapidly increases after the age of 70.

Symptomatic presentation of PAD ranges from claudication (pain from poor circulation produced upon walking), to ulceration of the tissue of the foot, or even gangrene. Often, these presentations are diagnosed by routine history and physical examination. Despite this, up to 75% of patients with claudication go misdiagnosed by primary care physicians. More importantly, the vast majority of patients with PAD are asymptomatic, and delays in this diagnosis often result in patients presenting later in life with far advanced PAD disease with higher risks for limb loss, stroke, and death. These asymptomatic patients need to be identified by some type of screening test.

**What is the current screening test for PAD?**
An accepted screening test for PAD is the measurement of the ankle-brachial index (ABI). The ABI is a simple, inexpensive, painless, and rapid test that can be performed in the office setting. The test requires some simple equipment including a blood pressure cuff and a handheld Doppler. Using these devices, the blood pressure is measured both in the arm (brachial) and at the ankle. Normally, the arm and ankle pressures should be roughly the same. The ABI is calculated by dividing the ankle pressure by the arm pressure. In a normal situation, this number should be 1. In the presence of PAD, however, the ankle pressure may fall and bring down the ABI number. When used as a screening test, an ABI value of less than 0.9 is considered positive for the presence of PAD. The ABI has been found to have 95% sensitivity and 100% specificity in the detection of PAD.

**Who should be screened for PAD?**
In general, we want to apply our screening test to the population at risk. The people most at risk are those that are older or people who have risk factors. Therefore, the population most at risk is all patients over 70 years of age and any patient over 50 with the risk factors mentioned previously (smoking, diabetes, hypertension, and elevated cholesterol). Trials looking at screening populations in this way identified 29% of patients in these groups had a positive screening test result (ABI < 0.9). Additionally, when these patients went on to further testing, 50% were found to have significant heart disease.

**When patients are identified with an abnormal ABI, what should be done?**
When PAD is detected in asymptomatic individuals, the main thrust of treatment is risk-factor modification. As mentioned previously, smoking cessation, blood pressure control, blood glucose management, and cholesterol reduction all become important therapies. The use of antiplatelet medications (aspirin, clopidogrel) has been shown to decrease the risk of stroke and heart attack in this at-risk population.

**SCREENING HIGH RISK ONLY**
I hope this article has shown that the general population does not need to undergo vascular screening. It is the specific high-risk group that really benefits from being evaluated for PAD. The ABI represents a simple, available, inexpensive screening test that is very sensitive in identifying the asymptomatic patient with PAD.
High blood pressure (BP), also known as hypertension, is a serious and common medical problem. Because the first signs of hypertension may be the development of complications including heart attack and stroke, hypertension has been called a "silent killer."

According to the National Health and Nutrition Examination Survey, hypertension affects nearly 30% of adult Americans and almost two-thirds of Americans over the age of 60. African Americans tend to have a higher prevalence of high BP than other populations. Blood pressure is divided into two numbers; for example, a normal measurement is at or below 120/80 mm Hg. The top number is called systolic, and the lower number is referred to as diastolic. The “mm Hg” is shorthand for “millimeters of mercury,” which is the traditional unit for measuring BP. All patients with BP greater than 140 mm Hg systolic or 90 mm Hg diastolic should be treated to avoid complications. For patients with mild hypertension, initial therapy may consist of lifestyle changes, including reduced salt intake, weight loss, and regular exercise. However, medications are often required to return high BP to a normal and safe level.

Amazingly, despite tremendous advances in medications and published expert guidelines by the Joint National Commission defining target BP goals, approximately 35% of patients with hypertension are not adequately controlled. Poor medication compliance remains an important reason for this problem, however, there remains a sizeable number of patients who reliably take prescribed antihypertensive medications and still don't achieve a healthy BP. In addition, although BP can be controlled in the majority of patients by taking multiple medications that act on the body in different ways, patients may be bothered by a sense of pill reliance, or they may develop side effects including fatigue, lightheadedness, or swelling.

CAUSES OF HYPERTENSION
Most hypertension is considered “essential,” meaning there is usually a family history but no identifiable and potentially correctable underlying physical abnormality. In approximately 5% to 20% of individuals with poorly controlled BP, however, a secondary and possibly treatable cause can be identified.

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The most common treatable cause of hypertension is renal artery stenosis (RAS), which is a narrowing in one or both kidney arteries. Most RAS is caused by atherosclerosis, or hardening of the arteries, that affects the kidney arteries and restricts blood flow to those organs. In response, the kidneys secrete hormones that raise BP. In addition, RAS may be an important cause of declining kidney function or heart failure. Young patients, particularly women in their 30s and 40s, can also have RAS caused by a unique condition called fibromuscular dysplasia in which scar tissue causes web-like narrowing in the kidney arteries. Significant clues to the presence of RAS include the initial development of poorly controlled hypertension early in life or at a late age, BP that is resistant to multiple medications or becomes suddenly worse, kidney failure occurring while being treated with certain types of BP medications (such as ACE inhibitors or ARBs), an unexplained sudden worsening of kidney function, and recurrent or rapid-onset “flash” heart failure. In these patients, an ultrasound, CT scan, or MRI scan should be considered to evaluate for the presence of RAS.

**INTERVENTION FOR RAS**

Catheter-based minimally invasive therapy for patients with RAS was first performed in 1981. Minimally invasive treatment for RAS involves either renal angioplasty (balloon stretching of a narrowed artery) or stenting (placement of a metallic mesh “scaffold” to keep the artery open). Angioplasty is performed by inserting a thin plastic catheter about the size of a pencil tip through an artery near the hip; the catheter is threaded through the arteries under x-ray guidance, and a balloon catheter is inflated within the narrowed portion of the kidney artery. Most patients will also require insertion of a stent to more reliably prop the artery open. There have been numerous reports describing the role of renal angioplasty or stenting. The benefit of renal angioplasty and stenting has been established for certain types of individuals. For these patients, correction of the renal artery narrowing with stent placement not only makes BP easier to control with the same or fewer medications, but it also can stabilize or improve renal function and reduce the frequency of heart failure episodes. Renal artery stenting has an excellent safety profile in experienced hands, with few serious complications. Despite this history of successful outcomes, careful determination of the anticipated benefits and potential risks are important before undergoing treatment; patients should consult with a doctor who specializes in renal artery interventions to discuss whether RAS is suitable for them.
RENAL DENERVATION

An exciting, new minimally invasive catheter-based treatment is currently undergoing clinical trials for patients with poorly controlled high BP. Like RAS, this treatment, called renal denervation, is performed by inserting a small, specialized catheter into the renal arteries. In renal denervation, this catheter sends energy through the wall of the kidney artery to intentionally damage surrounding nerve fibers that are involved in regulating blood pressure. Treatment of these sympathetic nerve fibers is very targeted and specific, and damage to the kidney artery or other serious risks is rare. Many different types of specialized catheters are being developed and studied for renal denervation. Energy can be delivered through these catheters in the form of radiofrequency waves or as highly focused ultrasound energy. Systems are also being developed for the catheter-based delivery of nerve injury medications through the wall of the kidney artery, as well as the administration of vibrational energy from outside of the body.

The renal denervation method that has been most studied to date is the use of radiofrequency energy (or radiofrequency ablation) for planned injury to the sympathetic nerves surrounding the renal artery. In the largest clinical evaluation so far, performed by Medtronic, Inc. (Santa Rosa, CA), the average blood pressure was lowered by 28 mm Hg when measured 1 year after the procedure. Other systems have had less-extensive evaluations but also appear to provide substantial BP lowering. Serious complications have been rare, and renal denervation has become well established as a treatment in Europe; however, it is expected that this treatment will not be widely available in the United States for several years.

LOOK FOR NEW OPTIONS

Minimally invasive catheter-based treatments such as renal artery angioplasty and stenting and renal denervation provide tremendous hope to many patients with inadequately controlled hypertension and may save lives by reducing the risk of heart attack, stroke, and kidney failure. There is no doubt that the results of active research and the continued development of new devices will play a large part in the increasing availability and use of these techniques and devices. In the world of minimally invasive therapy, new discoveries are found almost every year! If you have high BP, stay in touch with your doctor about emerging options that may become available to you.

Ask Your Doctor

Should I be tested if:
1. I have sudden onset of hypertension under the age of 30 or over the age of 55?
2. I have blood pressure that is suddenly difficult to control?
3. I have high blood pressure and recurring episodes of heart failure?
The vascular surgery service first met “Mr. G” on morning rounds. This patient had been transferred to Albany Medical Center for evaluation and treatment of a 14-cm abdominal aortic aneurysm (AAA).

This AAA was discovered incidentally after Mr. G was admitted for congestive heart failure and acute kidney failure. He was placed on dialysis for the kidney failure, which helped control his heart failure to a point where he could breathe on his own, but he had still complained of shortness of breath.

Although Mr. G was an extremely high-risk patient due to his congestive heart failure and renal failure, he was not a candidate for endovascular repair and needed open surgical repair. None of the surgeons was eager to operate on a man who was as acutely sick as he was. As a patient, he was even less enthusiastic. “Well, you know best,” he said, resigned. “I’ll do whatever you tell me we need to do.”

Mr. G’s weight of 350 pounds made the operation a difficult one from the start. Even just getting down to the aneurysm took a relatively long time. The patient had curiously engorged veins throughout his retroperitoneum (the space in the abdomen through which the aorta travels) that prevented us from being able to dissect out the aneurysm quickly. Eventually, we were able to visualize the aneurysm, and we noticed how tightly the ureter, which drains urine from the kidney,
was stretched over the wall of this very large aneurysm. Usually, the ureters run alongside the aorta from each kidney to the bladder; however, Mr. G’s aneurysm had become so large that it had stretched the ureter to the point where no urine was filling it. In fact, the ureter was pulled so tightly that it left a groove in the wall of the aneurysm.

We proceeded to open the aneurysmal sac itself. Typically, opening the aneurysmal sac will release some of the blood still in the aorta even after clamping; in this case, blood continued to spurt out of the sac. Holding pressure on the opening we had made, we quickly closed the aneurysmal sac again. Bleeding that intense is unlikely to come from back-bleeding lumbar arteries, and a communication between the aneurysm sac and the iliac or inferior vena cava was suspected. This is a situation called an aortocaval fistula—an abnormal connection between the aorta and the inferior vena cava, which is the main vein that drains blood back into the heart.

In Mr. G’s case, most likely his aneurysm had grown so large that it had eroded into his vena cava, creating this connection. In addition to explaining why we were unable to control bleeding although we had clamped the aorta, it also explained why the patient had heart failure. The venous system is normally a low-pressure system. Its main purpose is to drain the blood from the extremities and organs back into the heart so that circulation can continue. If there is a connection with the aorta, however, the pressure through the venous system increases significantly. This pressure is transmitted to the heart, which becomes overloaded and can lead to failure.

Ultimately, in the operating room, the fistula was closed, and the aortic aneurysm was repaired. With the sac decompressed, the ureter began to fill with urine, and for the first time in a few weeks, the patient had urine output. After the operation, Mr. G was admitted to the intensive care unit. He was extubated 3 days after the operation and recovered quickly and well. His congestive heart failure resolved, and he did not require any more dialysis. He went home 9 days after the operation without shortness of breath and making plenty of urine.

It turns out that Mr. G’s aortic aneurysm had ruptured but into the vena cava. This situation led to congestive heart failure and not death. It also allowed the aneurysm to possibly grow further and compromise the ureter, resulting in kidney failure. Mr. G was lucky that one operation cured all three problems!
Global Vascular Health VISITING INDIA

The Albany Vascular International Academy (AVIA) was formed as a joint venture between the Center for Vascular Awareness (CVA), Albany Medical Center, and the Vascular Group.

This relationship was designed to foster a global outreach program aimed at education and training of vascular specialists from around the world. Several candidates had already visited Albany during 2012 for periods of several weeks to months and been trained in the latest open surgical and endovascular treatments. The second part of this program involved American physicians traveling to other countries to reach a broader audience and foster relationships to grow this effort.

AN EXOTIC INVITATION
In September of 2012, five vascular surgeons from the Vascular Group in Albany, NY, were invited by the Vascular Society of India to participate as faculty in VSICON (Vascular Society of India Conference) in Jaipur, India. Ray, one of the clinical specialists from WL Gore, and two of our research and education coordinators traveled with us. This was the opportunity of a lifetime, and the very concept of the trip was both exhilarating and daunting.
Only three of us had ever been to India before. We all had to apply to the Indian government for visas and needed immunizations for protection against hepatitis A and typhoid fever. We left Albany on a Saturday evening, traveled for about 18 hours with one stop in London, and arrived in New Delhi on a Sunday evening. Contrary to what we might have imagined, the New Delhi airport was modern and spacious. It was only once we exited the airport that we met with the dense population, the congested roads even at midnight, and the striking disparity of high rises alongside slums.

CULTURE SHOCK
Most of us had taken some Benadryl and slept on the first leg of the flight, so the jet lag wasn’t that bad. We woke up early Monday to see some of the sights in New Delhi and spent most of the day viewing different architectural marvels and doing a little shopping. The term “culture shock” doesn’t even come close to describing what India does to one’s senses. The humidity in Delhi was palpable and the temperature in the 90s. Our eyes took in the sights of cars and people everywhere we looked. We saw families of four riding on small scooters designed for one person with only one of them wearing a helmet; five or more columns of vehicles driving in roads with only two or three lanes; monkeys, pigs, and oxen strolling through traffic; women wearing exotic-colored saris; children and adults begging for money; temples and ancient architecture dating back hundreds to thousands of years; individuals dressed like clowns trying to entice customers to enter stores; and on and on.

Our noses were aware of the smells of food as well as animals. The food was spicy and very tasty. For those of us who grew up eating Indian meals, we were in heaven. Our ears were treated to constant chatter in languages most of us did not understand as well as the incessant beeping of car horns. In India, the use of car horns doesn’t carry the same measure of veiled anger and aggression as it does in the US; rather, the drivers use the horn to politely let one another know they are in proximity to each other as a helpful reminder. The people we met were very friendly. They usually greeted us with hands together as in prayer and the Hindi word “Namaste,” which means many things such as hello, respect, and recognizing the almighty within each of us.

GRANDEUR, TOO
The next day, we packed and set off by car to Agra to see the Taj Mahal. Along the way, one of the cars got a flat tire. It was early in the morning, and three adolescent boys on bicycles stopped to see if they could help. Agra was as much an assault on the senses as Delhi, but it is not a big city, so the traffic congestion wasn’t as bad. I had seen the Taj Mahal as a teenager on a gloomy day and had been impressed, but this particular day was sunny without a cloud in the sky. The structure was magnificent and breathtaking from every view and distance. Afterward, we had a chance to meet the family whose ancestors had actually built the Taj Mahal and see some of their marble work and designs, which was a very impressive experience.

We then set off for Jaipur, where the conference was to be held in the state of Rajasthan. Along the way, one of the cars wound up with another flat tire, and Manny chased a large pregnant pig away while the tire was being changed. We arrived at our hotel in the evening. Over the next few days, while the conference was going on, we had an opportunity to see the area, taste the cuisine, and do a little more shopping. Jaipur is known as the “Pink City” for the color of its architecture, and it was where most of the scenes in the recent movie “The Best Exotic Marigold Hotel” were filmed. This was clearly the most beautiful place we had visited and a delightful continued barrage on the senses. Our experience was enhanced by Ray’s relatives there who took us under their wings and shuttled us around so that we could take in the flavor of the area in the 3 days we had there.

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THE CONFERENCE
The conference started on Wednesday morning. Almost all of the vascular attendings and fellows in the entire country were at this meeting. During this day, we participated in the Vascular Fellows' Conference. A 5-hour block of time was carved out, and within this period, we individually and collectively spoke to the Indian Fellows on topics of vascular disease ranging from head to toe. The Fellows were very knowledgeable and fully engaged in the discussion. The following 2 days we spoke at the main conference and presented our ways (“The Albany Approach”) of treating vascular disease as it is diagnosed in the US. During this session, we discussed open and endovascular treatment of carotid disease, thoracic and abdominal aortic aneurysms, and lower extremity occlusive disease. We also had an opportunity to engage in the general meeting and learn how vascular disease is approached and treated in India.

The interaction between the Indian surgeons and us was tremendous. We found both the fellows and attendings to be very welcoming of our comments and discussion of data. They had a great desire to learn about all aspects of vascular disease. The trip and meetings ended with a large banquet dinner with members of the Vascular Society of India. The meal was highlighted by all of us getting a chance to play elephant polo—yes, riding elephants!

What started as a vascular educational journey to a medically underserved nation turned into an experience of a lifetime. The trip set forth a path that has enabled us to evolve with the Vascular Society of India in teaching the nation’s vascular surgeons the most contemporary vascular diagnosis and treatment strategies.
A PATIENT’S STORY: Catherine

Meeting Catherine, you would be very surprised to hear her vascular story, but looks can be deceiving. Catherine is a slight woman, only about 5’4”, and weighing just about 120 pounds.

She is the daughter of a physician and claims to have been active all of her life. She was taught at an early age that she needed to eat properly and exercise. As she so eloquently put it, “I do not eat at the ‘Heart Attack Grill.’” She does admit, however, to smoking cigarettes for around 7 years.

**HYPERTENSION**

Catherine recalls always having normal blood pressure (BP), until a few years ago when, during a routine doctor’s appointment, she was diagnosed with hypertension. At that time, her BP was 160/90 mm Hg. Further testing also indicated that she had high cholesterol. Catherine’s primary care physician started her on medications to lower her BP and reduce her cholesterol levels. He followed her progress closely but soon realized this treatment wasn’t helping. This situation lead to further testing; a simple ultrasound indicated that Catherine’s underlying cause of hypertension was severe blockages in both her renal arteries supplying the kidneys. This surprising discovery was just the beginning of her medical journey.

**THE FIRST STEP**

Catherine recalls that as doctors were managing her hypertension and hypercholesterolemia, she also started to develop bilateral leg discomfort, which became particularly bothersome when she exercised on the treadmill. Initially, she ignored her symptoms. Although she was taking medications to lower her BP and cholesterol and exercising regularly, her hypertension was uncontrollable. Catherine was sent to a vascular surgeon who told her that she likely had renovascular hypertension—a condition that results from diminished blood flow to the kidneys, causing them to secrete a hormone that has significant impact on BP elevation. Catherine’s renal arteries needed to be opened, so she was scheduled for an angiogram and possible intervention with a stent. An angiogram is a minimally invasive procedure where a catheter wire is inserted in the groin region, which allows the vascular surgeon to visualize the artery and check for a narrowing or blockage. “I was nervous,” Catherine recalled. “I never realized how serious vascular issues could be. I was now faced with the realization that I truly had a problem. I put my faith in God and had the procedure.”

**MORE SURPRISES**

Catherine required two stents to treat 90% blockages in each renal artery. Within days of the procedure, her BP decreased substantially, and her doctors were able to take her off several of her antihypertensive medicines. As Catherine got her life back and became active again, however, she realized that her legs fatigued easily; this condition had a significant impact on her ability to carry out daily activities. It turns out that Catherine’s renal arteries weren’t the only ones with trouble. She also had severe blockages in both iliac arteries that brought blood flow to her legs, and she was experiencing lifestyle-disabling claudication. Again, her doctors tried a regimen that included exercise and daily medicine, without much improvement in her symptoms. Catherine underwent another procedure, bilateral iliac stenting, to improve her ability to walk. Sure enough the procedure worked. Finally, life was good, her BP was well-controlled, and Catherine’s legs were symptom-free.

**SETBACKS**

Unfortunately, this improvement was short lived, and the following year, Catherine’s BP began to slowly creep upward. When her pressure reached 185/90, she had difficulty concentrating, suffered frequent headaches, felt “spaced-out,” and lost her balance. She had the classic symptoms of recurrent renovascular hypertension. An ultrasound test confirmed the in-stent restenosis of both her renal arteries. “I was frustrated,” she said. “I was doing everything I was supposed to do, yet the arteries kept closing.” Catherine required bilateral renal interventions again to keep her renal arteries open. Her doctors contemplated surgical renal artery reconstruction at the time as well, but Catherine chose the less invasive and less risky of the procedures.

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Some time passed and Catherine regained her life yet again. Unfortunately, this was another short-lived “honeymoon,” and within months her BP started to climb again. This was the pattern: angiogram brought temporary relief, reduced BP, and improved ability to walk for a few weeks, then along came restenosis and the need for another angiogram. All of the stents in her renal and iliac arteries had severe restenosis, and her doctors advised that she would need surgery to bypass the blockages and restore blood flow to her kidneys. As time passed, Catherine’s blood pressure reached 220/106; she was experiencing headaches and unsteady gait and was admitted to the hospital for intravenous antihypertensive medication.

She finally underwent an aorto-birenal bypass; this surgical procedure required her surgeons to redirect blood flow from her aorta (the main blood vessel in the abdomen) to both her renal arteries beyond the blockages. After several days in the hospital, Catherine was discharged home, and at her follow-up appointment her BP was down to 112/66. Her BP has remained stable to date.

A MOTHER’S LOVE
Time went on and Catherine travelled to help her daughter in Syracuse with a family issue and then went to help her son in Virginia when he needed her. She received a tremendous compliment from Bill, her husband of over 37 years, when he said, “You know...you are not a quitter!” Catherine replied, “A mother will find the strength and will do anything for her children.” Indeed, family means everything to her. About a year after she had the aorto-birenal-bypass, Catherine and Thomas took a family vacation to Italy. They had a great trip, and Catherine was able to walk most of the time. She was able to spend Christmas in Virginia with her family that year.

About six months later she started to experience more difficulty walking. She could only walk 20 to 30 feet and then had to rest. Catherine knew this meant she was going to need another procedure to improve blood flow to her legs; the choices again were to have a minimally invasive reintervention or undergo surgical bypass. She once again chose the less invasive of the procedures and had bilateral iliac angioplasty and stent graft placement. Again the procedure was successful and Catherine regained her health yet again.

TROUBLE AT HEART
Over the following year, Catherine’s BP and leg discomfort were well controlled, and life was good. Then she began experiencing shortness of breath. The simplest tasks required that she sit and catch her breath. The problem persisted for months, and she finally complained to her doctors. She underwent a stress test and a cardiac catheterization and was found to have severe arterial blockages in her heart. Catherine required fairly urgent heart bypass. “The Lord was on my side again,” she said. Catherine was focused on getting well because her son was to be married in a few months. In fact, her health has held out for not only her son’s wedding, but her daughter’s as well.

“I was able to dance and walk around at both events and had a great time!”

LIFE GOES ON
Catherine has fought a long battle with atherosclerosis; hardening of the arteries that has affected her kidneys, her legs, and her heart. Today Catherine’s heart is strong and her blood pressure is under control, but she still has recurrent blockages in the iliac arteries to her legs. Yet she continues to live life every day.

“I am taking one day at a time.” Yes, she has achy legs, but, she says, “I keep plugging away because I know once I stop I’ll never walk again! When you push forward you will keep going and feel better and be better for it.” This is a lifestyle issue as well as her choice. Catherine’s medical—and personal—journey continues to unfold.

-by Sharon Cillis, RN
Blood flow only starts at the heart. The peripheral arteries and veins control blood delivery to all organs and are an integral part of the circulatory system.

There are a wide range of conditions and diseases that can affect a patient’s vascular system. Most often, these patients are geriatric with comorbid illnesses such as coronary artery disease, diabetes, renal artery disease, hypertension, and atherosclerosis. The vascular nurse’s efforts are a vital component of quality patient care for this population.

**ROLES AND RESPONSIBILITIES**

At the Vascular Group in Albany, our practice cares for patients both in an office outpatient and hospital inpatient setting. Our team includes physicians, nurses, and support staff. In an office setting, registered nurses function as clinical care coordinators with many roles and responsibilities. We are the educators, coordinators, and facilitators getting patients to their procedures in a safe and stress-free way. Nurse Clinicians have a critical responsibility to influence patients in a positive way to develop healthy lifestyles. Factors we concentrate on include smoking cessation, healthy diet, and exercise. Other roles include scheduling and checking clearances and labs for upcoming procedures. We often spend time just listening to patients, as they share their hopes and fears. In our practice, the patients come first.

Having prior experience in a hospital setting is a great prerequisite for a vascular nurse. It is very important to have a background regarding what postoperative incisions can look like, as well as an understanding of the discharge instructions patients will receive. Nurses in our office work closely with inpatients as we round each day with the full team of residents, fellows, and vascular attendings. Our goal is to clearly explain to the families each patient’s plan of care. We are also responsible for setting the OR schedule and communicating it to the physicians for the next day.

**PATIENT EDUCATION**

Patient education accounts for at least 75% of a vascular nurse’s role. The vascular nurse is responsible for reinforcing information about a wide variety of procedures and surgeries to patients and their families. Imagine hearing for the first time that you have an aneurysm that could rupture at any moment. Patients and their families are very often dealing with a new diagnosis that may include the need for several procedures or surgeries. When speaking with the patient and family members, we strive to put them at ease by explaining exactly what they can expect before, during, and after the procedure. Education booklets and all essential

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written information are also provided. These documents include instructions on various medications such as Coumadin, insulin, and diuretics, to name a few. Because we know families and patients will only remember about 50% of what we explain, we also make sure to have every detail written down. Before surgery, most patients have to meet with at least two of their physicians as well as an anesthesiologist. On the day of the procedure, we help to “educate” the physicians by providing them with angiogram films, CT scans, and other pertinent patient information.

COMMUNICATION
Clinical care coordinators are the front line when handling incoming phone calls. We receive calls from patients and their families, physicians, visiting nurses, and other medical facilities. When necessary, we confer with the patient’s physician. We need to accurately distinguish a true emergency from a routine matter that can be addressed through an office visit. The physicians trust our ability to make these important decisions, which can mean life or death in some cases. For example, a patient with a known aneurysm and a new onset of back pain could have a dissection. We recognize this as an emergency situation and would direct the patient to immediately go to the nearest emergency room.

PROFESSIONAL GROWTH
To remain up to date in the vascular nursing field, our team members are encouraged to stay abreast of current research, become involved in professional organizations, and seek professional certification. Joining and being involved in professional organizations such as the Northeast Chapter Society for Vascular Nursing provides educational opportunities related to the vascular field. Learning about new procedures, research studies, and products enhances your professional growth. Attending these meetings makes you aware of how other vascular groups throughout the country provide care.

Membership in the Society for Vascular Nursing can also provide the opportunity for public speaking, by presenting a topic at the local or national level; membership in a professional organization can also offer a chance to publish articles in various publications including the Journal of Vascular Nursing. The pride that you feel when you’ve shared new information with nurses and physicians that will make a difference in how they care for a patient is truly a rewarding experience. Many nurses in our organization have also obtained the Certified Vascular Nurse designation.

LONGEVITY
Many women and men make a lifelong career in vascular nursing. Nurses stay in this field because we enjoy the great challenges and rewards that each day brings. Seeing patients with a positive outcome after surgery or having them express their gratitude to us for taking the time to listen and alleviate their anxiety is more valuable than words can describe. As a seasoned nurse, teaching is like breathing, and there are many opportunities to train and mentor new nurses. Nursing is truly a team experience, and the whole is only as good as the sum of its parts. Through our hard work and dedication, we will continue helping patients live happier, healthier lives.
IN THE SPOTLIGHT:
An Interview with Philip S.K. Paty, MD

Dr. Philip S.K. Paty is a founding member of one of the largest vascular surgery practices in the world; The Vascular Group, professor of Vascular Surgery at Albany Medical College; and the Chief of Vascular Surgery at St. Peter's Hospital in Albany, NY.

Manish Mehta: Tell us about your involvement with the St. Baldrick’s foundation?

Philip Paty: The St. Baldrick’s Foundation is a charitable organization that supports finding cures for childhood cancers. My daughter Melissa had recently been successfully treated for Hodgkin’s lymphoma, so involvement with St. Baldrick’s is a labor of love for my family. We first got involved several years ago, when my son Dylan and I with a few of my friends from The Vascular Group raised $3,000 to help fight childhood cancer by shaving our heads.

Manish Mehta: How did you convince 11 members of The Vascular Group to participate in shaving off their hair in the St. Baldrick’s event earlier this month?

Philip Paty: About 6 months ago, we hatched an idea to get more of us involved and try to raise $10,000. The idea caught on like wildfire, and before we knew it, 11 members of The Vascular Group signed up to join our efforts to help St. Baldrick’s Foundation. On March 9th of this year, we raised nearly $13,000 for fighting childhood cancer. And yes, we all (Dylan Paty, Mari Mazzeo, John Sano, Chris Quinn, Terry Kimball, Abdul Khan, Dhiraj Shah, Benjamin Chang, Paul Kreienberg, Manish Mehta, and I) had our heads shaved. We collectively found the joy in participating and giving to a cause greater than ourselves, and we are hopeful that our team will grow in 2014!

Manish Mehta: What have been the most challenging and the most rewarding aspects of your career as a vascular surgeon?

Philip Paty: I’ve had the privilege to work with giants in the field of vascular surgery on patients with complex problems from not only New York State but from all over the United States and other parts of the world. The greatest enjoyment has been the development of close relationships with patients, nurses, doctors, and other staff.

Manish Mehta: How do you see vascular healthcare evolving over the next decade?

Philip Paty: My hope is that we continue to develop outreach and programs to raise public and provider awareness of vascular disease. We should embrace new technologies but use quality and outcome measures to determine what is best for the patient. Although we’ll continue to treat pathology, we will be focused more on vascular health and disease prevention from pediatric to geriatric ages.
The Vascular Group was founded to establish a comprehensive vascular care center consisting of board-certified vascular specialists trained in endovascular, angiographic, and surgical techniques. Our physicians distinctively combine expertise in both traditional open surgery and cutting-edge, minimally invasive catheterization techniques to manage peripheral vascular disease. We are committed to promoting vascular health and delivering the highest-quality care to our patients and our community.

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