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The Center for Vascular Awareness, Inc. is a 501(c)(3) not-for-profit organization dedicated to fostering mainstream consumer and clinical consciousness of vascular health standards, disease, prevention, and treatment. Maintaining and improving vascular health is a critically important issue. Patients and clinicians can benefit from learning about the impact of everyday lifestyle choices, risk factor modification, current ongoing vascular research, as well as medical, minimally invasive endovascular, and surgical treatment options for vascular disease.

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Letter from the Chief Medical Editor

The Joy of Medicine

At the heart of what truly defines our privileged profession as physicians is the Hippocratic Oath, a patient-centric perspective that reminds us “the health of our patient will be our first consideration.” Today, more than ever, it is easy to get lost in the everyday pressures of the medical profession, which require us to give up control, take care of other people’s lives, work endless hours, and make personal and family sacrifices to make it all happen. Critical thinking and significant resources are utilized in making the right diagnosis and implementing appropriate treatment strategies for patient care. In the midst of it all, sometimes, just sometimes, we forget the impact we truly have on our patients and their families, friends, and communities.

The joy of medicine—what makes us jump out of bed and get to work early in the morning, often times miss meals and work through the evening, and take endless overnight calls—is what I call the human factor. The vascular specialty is relatively new in the history of medicine, being only 50 years young. In the past decade, there has been an increasing effort toward providing education and developing patient awareness about vascular issues throughout the United States, and the Center for Vascular Awareness is excited to be a part of this campaign.

This edition of V-Aware will focus on the human factor behind vascular health initiatives. The patients become the experts in helping us better understand the implications of vascular disease and the ongoing efforts in improving vascular health. Esther tells us about her struggle to avoid stroke, and Dr. Paty and Dr. Spirig explain diagnosis, risk factors, and treatments. Phil takes us through his journey tackling multiple sclerosis, and Dr. Chang and I discuss some of the exciting potential vascular solutions to this disabling disease. Vascular disease is not just for the elderly, as William, a young college student and starting quarterback, shows us with the story of his lifestyle-changing traumatic vascular injuries; Dr. Kreienberg and Dr. Roddy talk about the early diagnosis and treatment strategies for venous injuries. Elise shares her experiences as a survivor of a catastrophic ruptured thoracic aortic aneurysm, and Dr. Darling and I do our part to raise awareness of this life-threatening condition that is often difficult to diagnose. Nurse Cheryl shares her experiences of dealing with another very serious condition, deep vein thrombosis, while Dr. Ozsvath and Dr. Saltzberg educate us on the value of prevention, early diagnosis, and treatment. Juan tells his story of living with an aneurysm and how simple treatments have changed his life, and Dr. Taggert and Dr. Sternbach discuss the value of early diagnosis and treatment. Bill shares his tale of living with PAD without ever knowing it and how he almost lost a limb. Dr. Byrne and Dr. Dadian explain why PAD affects so many of us and what can be done to prevent, diagnose, and treat this limb- and life-threatening condition.

Lastly, it was an absolute honor for me to have the opportunity to interview Dr. Dhiraj M. Shah, who has had a significant impact on how we practice vascular medicine and surgery today. That conversation is presented in our new column “In the Spotlight.”

I hope you enjoy this issue of V-Aware, and as always we welcome your comments and suggestions. Please write to us at info@vaware.org.

Warmest regards,

Manish Mehta, MD, MPH
President and CEO of the Center for Vascular Awareness, Inc., in Albany, NY
Esther is the sixth out of nine children. Most of her siblings have high cholesterol levels, and, similar to Esther, many have plaque buildup in their carotid arteries (the blood vessels that travel through the neck and supply blood to the brain). This condition is also known as *atherosclerotic carotid artery occlusive disease*. Two of Esther’s brothers have suffered a stroke; one at the age of 37, who was left paralyzed for life. Her other brother was successfully diagnosed early and underwent repair of his carotid arteries. Given Esther’s family history of carotid artery occlusive disease, you might think that her own diagnosis and treatment would have been quick and easy; unfortunately, this was not the case.

**START OF SYMPTOMS**

Esther recalls that her symptoms started in 2002. Her fingertips became painfully ulcerated and the nails were falling off. She also started experiencing double vision. Esther went to her primary care physician who referred her to a plastic surgeon. Knowing that she was a smoker, the plastic surgeon diagnosed her with a rare ailment called Buerger’s disease.
Occurring almost exclusively in smokers or people who use chewing tobacco, Buerger’s disease causes blood vessels supplying the hands or feet to develop blockages and can result in pain and ulceration.

The plastic surgeon directed her to use glue to prevent her fingernails from falling off. “This did not work, and then I had a mini-stroke,” says Esther. During her hospital admission, Esther recalls “not having any blood pressure in my right arm and a sign over my bed that said ‘do not take blood pressure from right arm.’” When she was discharged from the hospital, she was prescribed blood pressure medication.

SEEKING HELP
Esther had smoked for 43 years. The mini-stroke scared her enough to stop smoking and start searching for answers to her medical problems. After some research by her daughter, Esther was able to get a consultation appointment with a vascular surgeon.

Hoping to find a treatment for her condition, Esther and her daughter drove nearly 3 hours to The Vascular Group’s office in Albany, NY. At her visit, the vascular surgeon performed an ultrasound of Esther’s neck arteries and found that the innominate artery in her chest (which supplies the right arm and the right side of the brain) was more than 90% blocked. She was also found to have mild blockages in her carotid arteries that did not require any treatment other than aspirin. The vascular surgeon placed a stent to eliminate the blockage in Esther’s innominate artery and started her on Plavix and aspirin, medicines that help to prevent stents from reclogging. Over the next several days, to Esther’s delight, the improved blood supply resulted in healing of her ulcerated fingertip; eventually even the fingernail grew back. She was also able to have a blood pressure reading taken from her right arm again.

FOLLOWING UP
The vascular surgeon monitored Esther every 6 months by carotid ultrasounds performed during her office visits. Over the years, her innominate stent stayed open, and her right hand ulcers never returned. However, the initially diagnosed mild right carotid artery occlusive disease progressed in severity, and Esther subsequently underwent right carotid artery stent placement for stroke prevention.

Despite the fact that Esther tried her best to eat healthy and exercise, 2 years later, even her left carotid artery blockage worsened. Eventually, her vascular surgeons recommended a hybrid surgical and stenting procedure for stroke prevention. Her carotid artery blockages were so severe that during the procedure, which is generally done with only local anesthetic in an otherwise awake patient, Esther passed out. The vascular surgeons had to place a temporary shunt that diverted blood flow to her brain while her carotid arteries were reconstructed. The procedure was a success, and although Esther regained consciousness shortly thereafter the procedure, it took nearly 24 hours for her brain to regain full function. She does not remember passing out, the rest of the procedure, or the time afterward. After a few days in the hospital and clearance from the neurologist and vascular surgeon, Esther returned home. Since then, she has resumed her active lifestyle and will continue to routinely follow up with her physicians.

Esther would like others to see their physicians for regular check-ups. She stresses the importance of quitting smoking. She also recommends asking questions at every doctor visit and reducing your risk factors not just for carotid disease, but for any disease.
CAROTID ARTERIES AND STROKE

A buildup of plaque within the carotid artery in the neck (the vessel that brings blood to the brain) can cause narrowing or blockage leading to stroke. Embolization—clots that travel to the brain and block small blood vessels there—can also result in stroke. The warning signs of stroke include the following “Five Ss”:

1. Sudden loss of balance
2. Severe headache
3. Sudden temporary or permanent loss of vision in one or both eyes
4. Sudden numbness or weakness of one side of the body or in one arm or leg
5. Slurring of speech

Despite this list of warning signs, stroke may also happen silently: One out of 10 patients may not even notice that they have had a stroke. It is important to recognize subtle signs of stroke because the event may cause loss of function in the future, might be a warning sign of a more serious event to come, or could affect some cognitive aspects of the brain. Once stroke happens, it should be investigated by various tests and treated.

PREVENTION = TREATMENT

Four main vessels supply the brain with blood: two carotid arteries (left and right) and two vertebral arteries. Perhaps the best way to protect the brain from stroke is to treat atherosclerotic disease of the carotid artery. Cases of atherosclerosis (plaque buildup) and stenosis (blockage) of the carotid artery are second only to heart disease. Regardless of symptoms, if a person’s carotid artery is clogged with plaque by 60% or more, treatment is required to prevent stroke.

The mainstay treatment for carotid artery blockage today is surgery.

Surgical treatment of carotid artery disease is done using carotid endarterectomy. In this procedure, the surgeon opens the artery, removes the offending plaque, and sews the artery back together. Once the surgery is complete, the blood vessel is returned to normal and is 100% open, thus reducing the risk of stroke due to blockage.

Blockage of the carotid arteries can also be treated by placing stents inside the carotid artery in order to reverse the narrowing. The procedure is usually done with local anesthetic. The stent is inserted through a small incision in the femoral artery in the groin and, with x-ray guidance, is delivered through a narrow tube to the carotid artery in the neck. During the procedure, a small filter is placed inside the artery at the base of the brain to catch any debris that might break away from the blockage and reach the brain, potentially causing a stroke.

Following carotid surgery or stenting, the patient’s arteries are monitored by duplex ultrasound examination at various intervals, usually once a year. Ultrasound is the standard test for monitoring and diagnosing carotid artery disease. The procedure is painless and relatively quick, requiring 30 minutes to 1 hour. If there is any question about the ultrasound result, which may happen in 5% to 10% of patients, further tests may be necessary.

All in all, stroke is a preventable disease. In addition to reducing risk factors as previously discussed, carotid artery disease is treatable. Patients should, therefore, be aware of their risk and ways to reduce it, and, if necessary, receive treatment for any underlying disease.
There are two types of people in the multiple sclerosis (MS) community: those that will allow this disease to take over their life and others that will not. I am a 31-year veteran of this cruel disease, and I am not giving up.

I experienced my first exacerbation in 1981 when I was 27 years old. I had been married for only 3 months at the time and was leading a very active lifestyle. I was about to acquire my black belt in karate when I started feeling unusual symptoms. I had numbing and tingling in both feet that gradually inched up my legs, tingling in my face, and slurring of my speech. I went to my general practitioner and was immediately sent to the hospital for treatment for a possible stroke.

In the 1980s, physicians did not know much about MS; diagnosis was a process of elimination. After many diagnoses were ruled out, I was sent for a spinal tap with a neurologist who told me I probably had transverse myelitis (inflammation of the spinal cord). When the general practitioner reviewed my results, he told me that I had MS and would live about 20 years. Over time, I developed complete numbness in my left hip, and my left arm became completely weak. I had constant fatigue, especially in hot weather, with the need to take naps during the day. I experienced cognitive disability and was unable to recall things and stumbled over words. I also developed bowel and bladder issues with the need to take one packet of Questran (cholestyramine) per day. Eventually, I had to rely on a wheelchair to move around. Ultimately, I was diagnosed with primary progressive MS. I have to say that all of these symptoms made me feel mildly depressed, but I knew that I could not let my diagnosis hold me back.

**DRUG THERAPY**

Two years after my initial exacerbation, I was treated with steroids, as there were no other common medications used for MS patients. In 1986, magnetic resonance imaging was made available for diagnostic testing. I was probably one of the first people to be put into one of those machines. Based on my results, I was placed on different medications.
I tried Avonex (interferon beta-1a, injected once per week) and Betaseron (interferon beta-1b, injected every other day), but those did not help at all. I was then placed on Copaxone (glatiramer acetate, injected every day), and I felt better. After 4 years of injecting myself in the arms and legs, I went to my general practitioner and said that I wanted a drug holiday. He said that he did not see any harm in taking 1 month off. So I stopped my Copaxone for 30 days and felt fine. I then decided that I should start taking the medication again. When I went to fill my prescription, my HMO denied my refill because they said that I didn’t need it and MS was a disease that would just worsen.

I was upset and knew that I had to do something to maintain my quality of life. After some research, I turned to bee venom therapy. I would sting myself 5 or 6 times every other day, many times stinging myself up to 30 times per week. The effects worked for about a day and a half, and then I had to sting myself again. The bee stings did not cure anything, but they did give me more energy and I felt stronger.

**INVASIVE TREATMENT**

In October 2010, I had angioplasty performed in my right internal jugular, left internal jugular, and azygos veins. I immediately felt better. I was able to move my left arm freely, my legs felt stronger, and I had better control of my bladder. After 1 month, however, my symptoms started to return, and I had no energy again.

At a follow-up visit to my physician, ultrasound imaging was done, and I was told that my left jugular vein was “slammed shut.” I asked what my choices were, as I preferred to regain my quality of life, and I was told that a stent would be an option. After careful consideration of the pros and cons of stenting, I decided to have a stent placed in my left jugular vein. After the procedure, my quality of life improved until 3 to 4 months later when the symptoms returned. I then went for another follow-up examination and was told after an ultrasound that my stent was completely blocked, and there were no more treatments available.

I could not believe that I had run out of options. I asked again if there was anything that could be done and was referred to The Vascular Group in Albany, NY. By now, my blocked stents were starting to hurt my neck, and I needed help. After an initial consultation, I was told that I might actually have an option in the form of a surgical venous bypass. I was scheduled for bypass surgery at Albany Medical Center on May 17, 2012.

The day after my surgery, I thought to myself, I had really done it this time! I just had the left side of my neck opened up, my left internal jugular vein (IJV) removed along with the stents, and a portion of a femoral vein removed from my right thigh, which was used as the replacement of my IJV. After spending a couple days in the hospital, I was discharged home, and shortly thereafter, I recovered and started to feel better.

**BETTER LIVING**

Since my jugular vein bypass surgery, I can say that my quality of life is improving. My heat tolerance has improved. My cognitive function is progressively improving. I have discontinued my use of Copaxone, and I only have to take one packet of Questran per week. I have been placed on Coumadin to control blood flow through my vessels for which I am being followed. My most recent ultrasound indicated that the jugular vein bypass is open and functioning. I am not the only person who has noticed my improvements. My wife has told me that she sees an improvement, and my younger brother has noticed that I am sitting up taller in my chair. This is the first time in my adult life that I can say I am getting better.

Looking back at my journey with MS, one of my greatest pleasures is that I outlived the general practitioner that told me that I had 20 years left! I also realized that no two people in this world have the identical symptoms of MS. The only similarity we have is that we are all different. Just because treatments worked or failed for me does not mean that the next person will have the same results. All I can say is, if there is hope that something will work, try it.
UNDERSTANDING MS AND CCSVI

In September 2009, Italian physician Paolo Zamboni shared his research regarding the role of venous flow abnormalities in patients with MS. He noted that a significantly higher percentage of MS patients had central venous flow abnormalities when compared to healthy controls, a condition he referred to as chronic cerebrospinal venous insufficiency (CCSVI). Zamboni’s findings have redirected the efforts in MS research toward vascular immunology and mechanisms that might provide correlations between the vascular and neurodegenerative disease process.

Since Zamboni’s initial work, many independent centers have published research on MS and CCSVI. In 2010, Zivadinov and colleagues published the largest prospective blinded study with healthy matched controls reported to date; the researchers set out to determine the prevalence of CCSVI in patients with MS using transcranial and extracranial color-duplex ultrasound. Their findings indicated a significantly higher prevalence of CCSVI in MS patients when compared to the healthy controls (56% vs 22%; P < .001), and 80% of those with more advanced MS had CCSVI.

Zivadinov and colleagues investigated the relationships between CCSVI and iron deposition in MS patients by correlating venous hemodynamic parameters and iron concentration in deep gray matter and lesions measured by magnetic resonance susceptibility-weighted imaging in 24 patients (16 MS patients vs 8 age- and gender-matched healthy controls). Their findings indicated that all 16 MS patients and none of the healthy controls fulfilled the diagnosis of CCSVI. These findings suggest that CCSVI might play an important role in iron deposition in the MS patient’s brain parenchyma.

In October 2011, Dr. Claudiu Diaconu and colleagues from Cleveland presented the first report of histological analysis of venous structures associates with chronic cerebrospinal venous insufficiency. Their work was reported at the European Committee for Treatment and Research in Multiple Sclerosis. They harvested and analyzed bilateral IJV, subclavian, brachiocephalic, and azygous veins from seven deceased MS patients and six non-MS controls. Marked valve and other intraluminal abnormalities with potential hemodynamic consequences were identified in five of seven (71%) patients (seven abnormalities) and in only one of six (17%) controls (one abnormality).

Recently, Dr. Manish Mehta and colleagues from Albany, NY, presented the first report on the hemodynamics of balloon angioplasty for CCSVI when compared to healthy controls. Their results suggest an association between MS and CCSVI; the IJVs in MS patients had longer emptying times when compared to healthy controls. Furthermore, after balloon angioplasty, the flow across the IJVs in MS patients improved dramatically and matched that of healthy volunteers.

ANSWERING QUESTIONS

When it comes to the implications of CCSVI in MS patients, today, we have more questions than answers. Current endovascular treatments such as angioplasty frequently fail and need to be repeated, and there are NO implantable stents that are approved for use in the jugular veins. Dr Siskin and colleagues in Albany are conducting prospective randomized trials evaluating the implications of CCSVI in MS patients to better understand the vascular solutions to CCSVI. Surgical venous reconstructive procedures, similar to what Phil had, might improve the jugular vein patency rates further and play an important role in further understanding the implications of CCSVI. Much work lies ahead!
When you picture an 18-year-old college football player, you think of a strong, invincible, and unstoppable human specimen.

In 2008, William was a freshman at Rensselaer Polytechnic Institute (RPI) in Troy. A student in the biomedical engineering department, he was also one of the quarterbacks for the varsity football team. As a quarterback, you throw anywhere from 500 to 1,000 passes a week, which can take a toll on your shoulder. During the off-season, William would lift weights to stay in shape. One day while lifting, he felt tightness in his right shoulder and arm, his throwing arm. It felt swollen, and the arm had turned a purplish color. There really wasn’t much pain, he recalls, just discomfort and tightness.

**PAGET-SCHROETTER SYNDROME**

William went to his trainer at the college who sent him to the school health center, and the provider there sent him to a local hospital. The vascular surgeons evaluated William and suspected effort thrombosis or Paget-Schroetter syndrome. This condition results in deep vein thrombosis in an upper extremity from repetitive use and is often seen in young athletic men and women. A simple ultrasound test confirmed the diagnosis, and William was admitted to the hospital where immediate treatment with minimally invasive endovascular and surgical procedures was planned.

When asked how he felt being alone in the hospital, William said, “I was cool with it at that time. I had my college friends around to keep me company. I was young and didn’t really know what was going on. I had the ‘sports mentality:’ You get hurt, you do what you need to do to fix the problem, you get over it, and you get back to your sport. I was disappointed that the treatments planned would prohibit me from playing football that spring, but I never really thought about the long-term repercussions.”

Following his admission to the hospital, William underwent chemical thrombectomy; drugs used to dissolve clots were directly administered into his subclavian and axillary veins. Subsequently, William, like most patients with effort thrombosis, required his first rib resection. This surgical procedure essentially widens the narrow opening known as the thoracic outlet through which the vein, artery, and nerves to the arm exit the chest. Having a rib resected isn’t a lot of fun. The vascular surgeon cuts through the muscle and bone and must maintain a fine balance between bleeding and clotting.
**RECOVERY**

William was discharged back to college. The discomfort was tolerable. He had to rely more on his left hand, as his right arm and shoulder muscles were still tight. “I was on a blood thinner and had to get my clotting times measured often,” he said. “It was weird knowing that if I slipped on the ice, I would have to go to the hospital to see if I caused any bleeding damage.”

Slowly, he healed. The surgeons had discussed with William a change in lifestyle because effort thrombosis can reoccur. The surgery had taken place in February, and he recalls just starting to throw a football again the following June. William played football during the fall season of his sophomore year and then again in the spring. He recalls deciding to stay at school during the summer months to work out. It was during that time that he once again developed the tightness. Worrying that something bad had happened, William went to the local hospital emergency department. The doctors performed an ultrasound of the region and said everything was fine. Knowing how he felt the first time and realizing that these new symptoms were similar, William went to his vascular surgeons. He discovered that he did, in fact, have another blood clot. The constant motion of throwing the football caused scar tissue to build up. “I was in pain,” William said, “but I was also upset because I knew that this was the end of my career as a quarterback.”

William was admitted to the intensive care unit and was once again placed on TPA and heparin. It was summer, and most of his friends weren’t around, so this time, he was basically alone at the hospital. He was down, upset, and a bit angry. The doctors would make their morning rounds and talk around him. He felt alone, and he wasn’t as optimistic this time around.

**THE COMEBACK**

During William’s junior year, he sat out and didn’t play football. Before his senior year, however, that he realized that being on the football team was more important to him than being a quarterback. So he worked very hard to get back into shape and earned a different position on the team. “It was a good decision to continue playing,” he said, “I made lifelong friendships.”

(ARTICLE CONTINUES ON NEXT PAGE)
Presently, William is the quarterback coach at his old high school in California. He knows to look out for the signs of Paget-Schroetter syndrome in his players. He wants others who have this condition to know that they are not alone. “There are people who are going through it and have been treated,” he said. “You may feel like it is the end of the world or your career but everything happens for a reason. Having Paget-Schroetter syndrome challenged me to work harder. Life doesn’t give you adversity that you can’t or aren’t ready to handle. Having it has made me a different person today.

I am proud of how I handled the situation and worked very hard to earn another position on the team. Paget-Schroetter syndrome wasn’t the end of the world, it just changed my direction!”

THORACIC OUTLET SYNDROME
Thoracic outlet syndrome (TOS) refers to the constellation of problems that can result from the compression of upper extremity neurovascular structures as they leave or enter the thoracic cavity. The anatomic gauntlet that these structures must traverse, termed the thoracic outlet, consists of the medial portion of the clavicle (collarbone), the underlying first rib, and two small muscles called the anterior scalene and middle scalene. These structures form a complicated triangle through which the subclavian artery, the subclavian vein, and the multiple neural trunks of the brachial plexus are interlaced. Individuals who develop one of the compressive symptoms often have some congenital fault or proclivity causing abnormal pressure on the neurovascular structures. The presence of an extra cervical rib, either bony or cartilaginous, the abnormal insertion of the muscles onto the first rib, or extra muscles may also produce TOS.

In addition, acquired problems can incite TOS. Many patients with neurogenic TOS have had a whiplash-type injury causing the scalene muscles to become spastic secondary to partial denervation; the muscles in this condition tend to compress the brachial plexus. Patients with venous TOS have compression of the subclavian vein between the posterior portion of the clavicle and the underlying anterior scalene muscle. Excessive weightlifting may cause hypertrophy of the anterior scalene; repetitive, violent motion of the clavicle (such as produced by pitching a baseball or throwing a football) can cause injury to the subclavian vein, which might result in thrombosis. In addition, smoking, taking birth control pills, or hypercoagulability disorders will increase the chances for clotting.

The venous form of TOS is also referred to as Paget-Schroetter syndrome. Patients with this condition usually present with sudden unilateral arm swelling, often with pain, and discoloration of the affected arm. Questioning a patient will often elicit a history of recent severe physical activity; sometimes, patients will relate a history of soreness in the supraclavicular space.

In the past, management options usually centered on the administration of heparin (or more currently, Lovenox), followed by oral Coumadin. Although this treatment tended to prevent significant pulmonary embolization or limb-threatening phlegmasia, the combination of anatomic narrowing and the clot led to frequent permanent disability of the extremity. Up to two-thirds of patients managed by this method had persistent arm swelling and pain; this outcome was especially unacceptable in younger, more athletic patients.

A more aggressive treatment paradigm has evolved over the years to address TOS. Treatment now consists of initial catheter-directed administration of thrombolytic drugs into the clot, sometimes augmented by the use of endovascular devices. This approach is continued up to 48 hours until the bulk of the clot dissolves. At this time, venography will likely reveal the vein to be pinched between the clavicle and the anterior scalene/first rib. Operative removal of the muscle and rib is coupled with division of the external fibrous scarring within the lumen of the vein. If the patient is maintained on anticoagulation for 8 to 12 weeks, excellent vein patency and very low rates of arm disability will result.
Aortic Emergency: ELISE'S STORY

Elise is an elementary school teacher. At 50 years young, she is very active. Elise spends lots of time with friends and family, works out at the gym three times a week, and does not smoke. She rarely becomes ill, so when Elise felt sick, she knew something was wrong.

I thought I had a stomach bug; I felt nauseous and vomited a few times. Then I headed to the emergency room. The doctors there performed an EKG but found nothing. I was told that I was experiencing severe gas pain, for which I was given pain medicine, another Pepcid, and a prescription to have a gallbladder scan. I felt like something was very wrong, but I went home.

I took the next day off from work and went to my primary care physician to have the gallbladder scan, the results of which were normal. Still, the pain persisted. I then started to experience stabbing pains along my left side. I dealt with this pain and discomfort for the rest of the week.

(ARTICLE CONTINUES ON NEXT PAGE)

ABDOMINAL DISTRESS
It all started on January 20th. It was a normal day; I went to work and had dinner with my family. All of a sudden, I felt like I was having a gas pain in my lower abdomen. I had a lot of cramping, and there was a big knot in my stomach. To say the least, I was very uncomfortable. I took a Pepcid but it did not help. Then, the pain started moving up my abdomen and wound up under my ribs.

RUPTURE
I took the next day off from work and went to my primary care physician to have the gallbladder scan, the results of which were normal. Still, the pain persisted. I then started to experience stabbing pains along my left side. I dealt with this pain and discomfort for the rest of the week.
On January 28th, I went shopping with my family. When I got out of the car, I felt a weird pop in my chest; it did not hurt, it just felt strange. I proceeded to walk into the store and then collapsed. I was rushed to a local emergency room where the doctors performed a computed tomography scan. The physician told me that I had a ruptured thoracic aneurysm and that it was a very serious situation. I had to be transferred to another hospital, but the doctors were not sure if I would survive the transfer.

As soon as I arrived at Albany Medical Center, I was told that I was immediately going into surgery. When I awoke, I was in the vascular intensive care unit. I later found out that I had a life-threatening condition known as a thoracic aortic dissection, which is a tear in the inner lining of the thoracic aorta, the largest blood vessel in the body. This dissection eventually led to a rupture of the aorta, which caused the sudden drop in my blood pressure and made me collapse when I was out shopping.

I was lucky that I survived that initial rupture, was diagnosed appropriately, and then was transferred to a medical center where vascular surgeons and anesthesiologists were able to manage what could have been a catastrophic event. I underwent and survived an emergent endovascular repair of my ruptured thoracic aortic aneurysm; this procedure took a team of vascular surgeons and anesthesiologists several hours, while dozens of my family members paced in the waiting room. After the procedure, I spent a few days in the vascular intensive care unit and then a few more on the general vascular floor before being discharged home.

REALITY CHECK
When I made it home, everything really hit me. I was scared. It had all happened so quickly. I was fatigued, developed depression from the stress of my situation, and lost a lot of weight. My own inner strength and incredible family support allowed me to recover and take control of my life again.

Since then, there have been a few false alarms when I was hospitalized for episodes of pain similar to what I experienced prior to surgery. My ruptured thoracic aortic aneurysm has been repaired, but my doctors have set forth a lifelong plan to monitor my condition at routine intervals.

AORTIC EMERGENCY
Aortic emergencies are one of the most life-threatening events that can affect the aorta. This urgent condition brings thousands of Americans to the emergency room each year and has been responsible for taking the lives of many famous people such as John Ritter, Betty Garrett, Harvey Korman, Lucille Ball, and Albert Einstein, to name a few.
The aorta is the main blood vessel that carries blood from the heart to the rest of the body and is similar in size to a garden hose. Aortic dissection primarily affects the thoracic aorta, and symptoms can be similar to that of a heart attack: a sudden onset of tearing, sharp, or stabbing pain in the chest and back that can radiate to the neck, jaw, and abdomen. The presenting symptoms often reflect the location and extent of the aortic tear, which may be associated with severe abdominal and leg pain, heart failure, renal failure, or even stroke.

Thoracic aortic dissections are twice as common in men as in women, and although they can occur at any age, they are most common in adults between the ages of 50 and 70. Risk factors include hypertension, atherosclerosis, smoking, a family history of aortic disease and heart disease, blunt chest trauma, and genetic disorders such as Marfan syndrome and Ehlers-Danlos syndrome.

Thoracic aortic dissections are often underdiagnosed and undertreated; however, once this condition is diagnosed, the patient requires immediate medical attention.

**LIFE-SAVING STEPS**

The thoracic aorta normally measures around 3 cm. As the diseased aorta swells to near twice its normal size, the risk of rupture increases. Treating patients before an aneurysm ruptures is crucial, because 90% of those who experience a ruptured thoracic aneurysm will die.

Today, there are many treatments available for patients with thoracic aneurysms, including open surgery and newer, minimally invasive endovascular procedures. Aneurysms generally cause no symptoms; however, patients with ruptured aortic aneurysms experience intense pain in the chest, abdomen, or the flank region over the kidneys or back, and might have a sudden drop in blood pressure and signs of shock. In the emergency room, physicians generally make the diagnosis of rupture by a strong index of suspicion, a physical examination, and computed tomography scans. The patient’s only chance of survival is with an expeditious repair.

**ENDOVASCULAR REPAIR**

Traditionally, open surgical repair was the only option for patients who survived a rupture long enough to make it to the emergency room. However, over the past decade, new endovascular technology and techniques have allowed vascular surgeons to perform complex repair procedures by minimally invasive methods. These endovascular procedures have been shown to limit complications and improve patient survival.

Under x-ray fluoroscopic guidance, access is gained into the thoracic or abdominal aorta through the femoral artery in the groins. A stent graft composed of synthetic fabric supported by a tubular metal mesh framework is packaged into a sheath and transported to the site of aneurysm rupture. The stent graft is anchored in healthy aortic tissue above and below the site of aneurysm rupture to exclude the aneurysm and stop the ongoing hemorrhage.

**BE AWARE**

The overarching take-home message of Elise’s story is simple: The only way to avoid a catastrophic aortic emergency is to be aware of your risk factors (older than 60 years of age, family history of aneurysms, tobacco use, or a history of heart disease, high blood pressure, or peripheral arterial disease) that might predispose you to developing an aortic aneurysm or dissection. If you are at risk, talk to your doctor about simple, noninvasive tests that can help detect these potential deadly conditions.

If an aneurysm is diagnosed, consult with a vascular surgeon about risk factor modification and treatment options, and don’t forget to talk to your family members about screening, as aneurysms are hereditary.
Cheryl is a visiting nurse and the mother of four children. She takes care of her patients and educates them about taking care of themselves and listening to their bodies. So why didn’t she listen to her own?

**THE JOURNEY**

It all began in 2006. I remember what started out as a slight discomfort in my right side evolved to excruciating pain that had me doubled over and lose my breath. I went to the ER and was diagnosed with a gallbladder attack. I was sent home from the hospital and told to make an appointment to have my gallbladder removed. I had the surgery shortly thereafter, but my symptoms didn't improve. I was still experiencing moderate discomfort along my right ribcage and some mild shortness of breath.

At that time, I worked out regularly, and my doctors felt I might have pulled a muscle during exercise. As my symptoms persisted, my doctors ordered a CT scan on my chest and abdomen, which lead to a unexpected discovery. After the CT scan as I was sitting in the waiting room, the doctor called and said, “Please don’t be alarmed, but you have a very large clot in your lung, a pulmonary embolism (PE), and you need to go to the hospital now.” I was taken to the hospital via ambulance. I consider myself very lucky that the PE, which I have since learned is a life threatening condition, spared me. I was admitted to a local hospital, received treatment, and was sent home on the blood thinners Lovenox (enoxoparin sodium) and Coumadin (warfarin). I took Coumadin for 6 months. All my blood tests were normal and the PE was considered to be a fluke or possibly caused by the birth control pills I was taking at the time.

**MAY-THURNER SYNDROME**

Over the next 4 years I felt totally fine and went on with my everyday life activities. Until April 2010, when I developed a blood clot in my left leg that extended from my umbilicus to my ankle. My leg was painful, swollen, and discolored. I suspected a blood clot and immediately went to the ER, where an ultrasound confirmed my suspicions and I was diagnosed with
a blood clot extending from my ankle to my pelvis. I was admitted and treated with blood thinners. I was concerned enough that I asked the doctors to keep me in the hospital until we could figure out the underlying cause. At the hospital, I underwent a battery of tests including a CT scan; I was diagnosed with May-Thurner syndrome.

May-Thurner syndrome occurs when the iliac artery compresses the underlying left iliac vein and leads to a stricture that can lead to decreased flow and formation of deep vein thrombosis (DVT). Well, I heard the doctor say “vascular issue” and immediately asked for a consult with a vascular surgeon. I was assured that, “the meds would take care of it” and that a vascular surgeon wasn’t needed.

THE VASCULAR SPECIALIST
I was sent home again on Lovenox injections and Coumadin. I lay in bed for a few days in pain that was unrelieved by narcotics. I researched May-Thurner syndrome and discovered that I definitely needed further intervention. I called The Vascular Group in Albany, NY, and was seen within a few days. The doctor had my records and could see the pain in my face. She did not even take one look at my leg; she put me in a wheelchair and scheduled surgery for that same day.

Over the next few days, I required several procedures, including placement of an inferior vena cava filter to protect me from having another PE, mechanical thrombectomy (mechanical extraction of clot from my iliac and femoral veins), chemical thrombectomy (intravenous administration of clot-dissolving drugs), and finally, placement of an iliac vein stent to keep my veins open once the blood clot dissolved.

Thankfully, these treatments helped and allowed me to resume my daily living even return to work. I have learned that the diagnosis and treatments of many vascular issues that affect us all have evolved significantly and there is a significant lack of awareness amongst public as well as healthcare providers.

CONFIDENCE
Being a nurse and part of the healthcare system that I take great pride in, my experience as a patient left me wondering about the gaps in DVT awareness and vascular knowledge in general. Our healthcare system has wonderful doctors and other providers, yet it also presents many barriers to good health. Once I was able to cross the barriers and received the care I needed, my confidence in our healthcare system returned. Of course, I also know that I got lucky; I could have continued to develop clots and could have died from the PE. I was sent home from a hospital, probably because the doctors didn’t understand that my condition was a life-threatening vascular issue.

RESIST, QUESTION, PUSH
I would like others to learn from my experience. Listen to your body. Be persistent with your requests for care. I should have listened to my body. I knew I wasn’t having a gallbladder attack. I should have resisted, questioned, and pushed to be seen by a vascular surgeon early on. I was told that my problem was a vascular issue, yet I didn’t get a vascular consult in the hospital. I had to schedule my own appointment.

DIAGNOSIS AND TREATMENT
DVT is a condition in which a clot or thrombus forms in one of the deep veins of the body, most commonly in the leg or pelvis. If undetected, the thrombus can extend into the leg, causing severe swelling and pain. More dangerously, the clot may also break loose and travel to the lung, causing PE, a potentially lethal complication. Fortunately, DVT can be detected by an easy diagnostic test called a duplex ultrasound, which is noninvasive, can be performed in a doctor's office, and can immediately diagnose the problem.

In about half of all cases, DVT occurs without any noticeable symptoms. When signs of DVT do occur, they include swelling, pain in the leg (often starting in the calf and feeling like a cramp or charley horse), redness and warmth over the affected area, or pain and swelling in the arm or neck if the blood clot occurs in that area.

Patients at high risk for DVT include those who are on prolonged bed rest; had recent surgery; smoke cigarettes; have bone fractures; who take medications such as estrogen or birth control pills; who are obese; or who sit or have sat for long periods, such as in a plane or car. Also at higher risk for DVT are people who have cancer, who had a previous blood clot, or who are hypercoagulable (a condition in which the blood clots more readily). DVTs are most common in adults over the age of 60 but can occur at any age.
For decades, treatment with anticoagulant drugs has been the mainstay therapy of DVT, with two main goals: preventing a clot from growing larger and limiting the risk of the clot becoming dislodged and traveling with venous flow to the lung resulting in a PE. In recent years, the treatment for most patients with uncomplicated DVT has evolved from prolonged hospitalization to outpatient therapy. Beyond standard anticoagulation, clinical evidence has emerged to support the use of adjunctive therapies aimed at restoring venous outflow. The goals are to minimize damage to the veins and restore function more rapidly, while speeding a patient’s return to everyday activities and preserving both function and appearance of the affected leg.

**QUICk InTerVenTioN**

With prompt screening and patient evaluation, treatment may be instituted with appropriate adjunctive therapies. Quick intervention may enhance long-term outcomes, minimizing future symptoms, disability, and overall treatment cost. For appropriately selected patients, the following treatments are currently available and have been endorsed by the American College of Chest Physicians.

**Interventional techniques for treatment of deep vein thrombosis:**

**Thrombolysis**

Drugs can be used to pharmacologically disrupt the thrombus. Tissue plasminogen activator is the agent used most frequently. Catheter-based delivery of the thrombolytic agent directly into the clot is preferred, although systemic therapy has been used as well.

**Mechanical thrombectomy**

Physical disruption of the dominant thrombus may be accomplished with devices that either directly destroy the clot by macerating it into small particles or disrupting it with multiple fluid jets. The resulting particles may be removed by catheter-based aspiration or dissolved with thrombolytic agents.

**Filters**

The advent of retrievable vena cava filters may improve treatment for lower extremity thrombosis by decreasing the risk of embolization induced by catheter-based intervention.

**Catheter aspiration thrombectomy**

A clot can also be removed percutaneously by catheter. Generally, this treatment is given in conjunction with drugs that can break down the clot (thrombolysis).

**Balloon angioplasty/stenting**

Balloons are used both to treat focal narrowings in the affected veins, which may serve as an impediment to blood flow, as well as another way of breaking down thrombus. In instances where a narrowing proves resistant to treatment with balloon angioplasty alone, a stent may provide the support needed to reopen the vein completely. Although stents remain a last resort, they are commonly used in patients with May-Thurner syndrome, in which the left iliac vein is compressed extrinsically by the right iliac artery. Rapid restoration of blood flow certainly helps limit some of the acute life threatening as well as long term disabling complications of DVT.
Understanding Aneurysms:  
**JUAN’S STORY**

“My wife is the biggest advocate for my health,” said Juan, a retired sales coordinator. Juan’s wife, a retired licensed practical nurse, encourages him to undergo regular check-ups.

During a routine examination 5 years ago, Juan had a computed tomography (CT) scan of his abdomen, which revealed a 3.7-cm abdominal aortic aneurysm (AAA). Juan was told that his AAA was small and didn’t require repair at the time, but that it would be monitored for growth.

Then, 4 ½ years ago, Juan started experiencing “stop-you-in-your-tracks” lower back pain, which settled along his waistline. The pain was persistent and greatly affected his quality of life. Juan had maintained an active lifestyle but was eventually reduced to sitting in a recliner chair for most of the day and taking prescription pain medicine that only offered limited relief. The pain became so unbearable that Juan lost his appetite; over the course of a few months, he unintentionally shed nearly 40 pounds. Juan even tried physical therapy, but that only seemed to make matters worse. Eventually, another CT scan of his abdomen indicated that the 3.7-cm AAA had grown to 8.4 cm. “The aneurysm was so large, the doctor thought it looked like a tumor eating my spine,” said Juan, who was told to immediately discontinue the physical therapy sessions and was sent to The Vascular Group in Albany, NY, for evaluation.

**A CLOSE CALL**
Juan scheduled an appointment for a Thursday 3 days before Christmas. In conversations with his vascular surgeon during the office visit, Juan reported having chronic back pain for months. During the examination, when the vascular surgeon pressed on the aneurysm, Juan felt exquisite tenderness through his abdomen and back. Juan was told that he had to be immediately admitted to the hospital and would require AAA repair, as he could possibly have a contained rupture. With his wife at his side, Juan was admitted that evening and was scheduled to have a minimally invasive endovascular AAA repair the next day. When asked how he felt at the time, knowing he would undergo repair for an aneurysm the size of his fist, Juan said, “I felt confident that the procedure would go well and hopefully put an end to my constant back pain.” Juan’s surgery was indeed a success. The aneurysm was successfully treated, and he experienced relief from his back pain almost instantaneously. “I felt like all of my problems were over,” he said. Juan returned to his home that Saturday, which was Christmas Eve. He was surprised at the speed of his treatment. “I could not believe that you could have an aneurysm repair and be discharged the very next day.”

**A FAMILY AFFAIR**
It turns out that Juan has a family history of aneurysms. He is the fourth of five children—two sisters are still living and two brothers have both died. One of Juan’s older brothers passed away due to a brain aneurysm, and his younger sister is currently undergoing monitoring for her own aneurysm.

Aside from his family history, Juan has several other risk factors for developing an aortic aneurysm as well as other forms of vascular disease. He has a longstanding history of high blood pressure, high cholesterol, chronic obstructive pulmonary disease, heart disease, and mild renal insufficiency. He also smoked for nearly 40 years and has recently quit.

Two weeks after being discharged from the hospital, Juan saw his vascular surgeon for a follow-up evaluation. During the visit, he was scheduled for routine CT scans to evaluate the integrity of his endovascular aneurysm repair (EVAR) as well as to monitor for any development of other aneurysms, which, as Juan learned, can occur in as many as
20% of patients. Over the next year, Juan regained a life free from back pain; however, a follow-up CT scan showed that during those 12 months, a new aneurysm had developed and grown to over 5 cm. This time, the problem was in Juan’s chest involving his thoracic aorta. Juan underwent another minimally invasive endovascular repair for this thoracic aortic aneurysm.

Since both procedures, Juan has returned to his favorite activities. The man who was once relying on pain medication and sitting in a chair most of the day is now back to fishing, shooting pool, gardening, and enjoying his family. Juan is eager to share his new awareness of vascular disease. “When I am with my friends, I encourage them to get screened, especially those who complain of symptoms that are similar to the ones I had,” he said. “I also encourage my children, especially my son, to get medical screening.” When asked what he would like people to take away from his story, he said, “Have confidence in your doctor. Make sure you get checkups, and if you have questions, make sure that you get answers.”

AORTIC ANEURYSMS
An AAA is a progressive weakening and ballooning of a blood vessel that, if not diagnosed and treated, can lead to rupture and death. People over the age of 60 are at greatest risk of developing this condition, and it is estimated that more than 1.5 million Americans have aneurysms but less than 5% are treated. Unfortunately, the initial expanding process does not cause any symptoms; people with aneurysms rarely realize anything is wrong. To make matters worse, aneurysms are difficult to detect by physical examination alone, meaning that the vast majority of aneurysms are not found during routine doctor visits. Too often, the first sign of a problem is life-threatening rupture—a crisis that could have been avoided had the aneurysm been detected earlier through screening and managed appropriately.

MAJOR RISK FACTORS
Smoking, advanced age, male gender, and family history are the most common risk factors associated with AAAs. Smokers are up to seven times more likely than nonsmokers to develop an AAA.

Unfortunately, ex-smokers still carry an increased risk of having an aneurysm, up to three times that of never-smokers. A number of other risk factors include high blood pressure, high cholesterol levels, and atherosclerotic heart disease.

MANAGING AAAS
Currently, there are several options for treating AAAs, including minimally invasive endovascular repair and traditional open surgical repair. The right treatment is determined by a detailed and thorough evaluation of the patient, as well as a review of the risks and benefits of either procedure. Minimally invasive endovascular repair has revolutionized AAA repair by decreasing morbidity and mortality rates and also by improving recovery. A stent graft is deployed inside of the aneurysm to divert blood flow and prevent pressure on the walls of the bulging aorta.

EVAR can be performed under general anesthesia, spinal or epidural anesthesia, or even local anesthesia. The procedure takes approximately 1 to 2 hours to perform and is generally associated with fewer complications than standard open surgical repair. In patients who are considered suitable candidates, EVAR has a technical success rate of greater than 98%. Complications affecting the heart, lungs, kidneys, bowels, and other organs occur in fewer than 10% of patients, and the chance of death as a result of EVAR is approximately 1%.

Most patients recover in the hospital for a couple of days and return to their normal baseline activities in 2 to 4 weeks. After EVAR, patients require lifelong follow-up by their vascular surgeon, and they must undergo routine clinical evaluation and appropriate imaging to evaluate the integrity of the stent graft and confirm continued aneurysm exclusion.
Bill was the head of maintenance at a four-story nursing home, and was very active at work and in his personal life. He golfed and spent a lot of time with his family.

Bill’s only medical issue was that he had diabetes, for which he was monitored and receiving treatment. Bill’s active lifestyle quickly came to a halt, however, during his one-year battle with limb-threatening ischemia.

**FIRST ADMISSION**
In late December 2010, Bill spotted blisters on both feet near his small toes. A couple days later, he noticed that the blisters had turned black. He went to the local emergency department and was diagnosed with a foot infection; he was admitted to the hospital and treated with intravenous antibiotics. After 3 days, he was discharged from the hospital and was subsequently treated weekly as outpatient at the wound care center. Over time, his right foot healed but his left did not show improvement.

**SECOND ADMISSION**
Later that February, Bill was readmitted to the hospital for a nonhealing worsening left foot infection. While in the hospital, the vascular surgeons suspected that Bill wounds weren’t healing due to poor circulation. The doctors ordered a noninvasive lower extremity blood pressure test (pulse volume recording), which indicated blockages in the femoral arteries that supply blood flow to Bill’s feet. The vascular surgeons placed three stents in Bill’s femoral arteries to improve the circulation to his left foot. The infection had progressed enough that Bill’s small toe had to be amputated. “It did not bother me because I wanted to do whatever was necessary to get the infection under control,” he said. “I thought, if I could get this infection healed up, I was good.”

(article continues on next page)
Unfortunately, what Bill didn’t realize at the time is that his diabetes increased his risks for recurrent infections. In less than 3 weeks, two additional toes needed to be amputated to clear all the infection. Following discharge from the hospital, Bill resumed his weekly visits at the wound care center and required further debridement of his wounds.

**HYPERBARIC THERAPY**

To optimize wound healing, Bill’s vascular surgeon also advised him to start hyperbaric chamber treatments. “It’s not something you look forward to,” Bill said about the treatments. “It is just something you have to do. Being in the chamber feels like being in the cabin of an airplane.” He went to hyperbaric therapy 5 days a week and completed twenty “dives” over the next 4 weeks. Regardless of Bill’s improved lower extremity circulation and the hyperbaric therapy, his two remaining toes went onto develop blisters and infection and resulted in another hospitalization.

**THIRD ADMISSION**

Bill’s presumed diabetic foot infection had spread into the bone. He required IV antibiotics and the remaining two toes were amputated. Eight days after the procedure, Bill was discharged from the hospital. Over the next 2 months, Bill would go on to complete another course of IV antibiotics at home, and another 20 dives in the hyperbaric chamber. Finally, by the end of July the infection was completely gone.

Now, Bill had to work on becoming active again. He was given clearance from his physicians to resume normal activities, and as difficult as it was, Bill started to take control of his life again. “The whole time I was telling myself, push on now, it could be worse!”

Now, Bill plays golf with his friends and rides a bike for exercise. “People ask how I am able to walk without toes. I tell them that I just do it. I might not be able to run a marathon, but I can walk, play golf, and carry out my everyday activities.”

Bill wants people, especially those with diabetes, to know, “You have to understand what you should and should not eat. If you neglect your diabetes, it will get bad. Get it in your head that your health is important.”

**WHAT IS PAD?**

Peripheral arterial disease (PAD) is a manifestation of systemic atherosclerosis, also known as hardening of the arteries, and it can affect any of the arteries supplying blood to organs and extremities in the body. As we age, cholesterol, fat, and calcium build up in the artery walls, forming plaques that can block blood flow. When blockage occurs in the coronary arteries it can lead to a heart attack; when a plaque affects the arteries supplying the extremities it can lead to leg cramps, sores, ulceration, and gangrene.

**RISK FACTORS**

The main risk factors for PAD are a sedentary lifestyle, smoking, diabetes, high cholesterol, high blood pressure, or a family history of heart disease or stroke. PAD becomes more common after age 40 and is one of the most serious clinical problems our health system faces as the population ages. PAD affects 5% to 10% of patients between 55 and 65 years of age and can affect as much as 20% of the population over 65.
Unfortunately, only 25% of people with PAD are ever diagnosed and receive treatment, most likely because the classic symptoms of PAD are detected in only 10% to 15% of patients. PAD is often ignored, as many people think their aches or pains are simply related to aging or arthritis; however, this serious disease can dramatically reduce life expectancy.

Initially, as plaque builds up in the arteries that supply blood to the legs, it causes pain in the muscles during walking or exercise that goes away with rest; this is called intermittent claudication. This disorder results from an imbalance in the supply and demand of blood flow required for regular muscle activity. The severity of PAD depends on how early it is detected and any pre-existing health factors, especially smoking, high cholesterol, heart disease, or diabetes. In later stages, leg circulation may be so poor that pain occurs even during periods of inactivity or at night. This rest pain usually worsens when the legs are elevated and is often relieved by lowering the legs, due to the effects of gravity on blood flow. In severe cases, PAD can lead to tissue death (gangrene), which, if left untreated, may result in the need for amputation.

**TREATMENT OPTIONS**

Treatment can take the form of lifestyle changes, medicines, and endovascular or surgical procedures, if needed. Because individuals with PAD are at high risk for heart attacks and stroke, they must take charge of controlling their risk factors related to vascular and cardiac disease. There are a number of life-saving steps that you can take right away to help prevent and control PAD.

Get help to quit smoking, and set a quit date now; manage blood pressure; reduce your cholesterol; control your blood sugar; practice proper foot care, especially if you have diabetes; follow a healthy eating plan; and exercise regularly.

Over the past decade, minimally invasive, endovascular treatment options for PAD have revolutionized vascular specialists’ ability to treat patients with disabling symptoms of intermittent claudication or chronic limb-threatening ischemia. These so-called percutaneous options do not require a large surgical incision and are conducted through a narrow catheter that is threaded through a small opening in an artery, usually in the groin. When deciding on the type of therapy to use, whether it is minimally invasive or surgical, vascular specialists make decisions based on the patient’s symptoms, location of arterial blockages, their own expertise in performing the endovascular and surgical procedures, and the risks and benefits of these procedures to the patient.

Identifying barriers to healing is the most important first step in treating patients with nonhealing wounds. Along with improving circulation, meticulous wound care is essential. Diabetes mellitus is one of the most important diseases shown to negatively affect wound healing. Tissue ischemia leads to increased risk of infection and the inability to progress through the normal stages of healing. In patients with PAD and nonhealing wounds, restoring and improving arterial flow increases the delivery of oxygen, nutrients, and antibiotics to the tissue. Hyperbaric medicine has been used as an adjunct to treatment. Studies have shown that increasing the partial pressure of oxygen at the tissue level can impede bacterial growth and promote neovascularization and healing.

The process of reducing your risk of serious complications from PAD starts with recognition of the disease. Your doctor can determine if you have PAD and what treatments you might need.
IN THE SPOTLIGHT:
An Interview with Dhiraj M. Shah, MD

Dr. Dhiraj M. Shah is a cofounder of one of the largest vascular surgery providers and vascular healthcare leaders in the world, The Vascular Group and The Institute for Vascular Health and Disease in Albany, NY. He has long been considered a pioneer in vascular surgery, and he has helped shape the specialty as it stands today. The first installment of our new column, “In the Spotlight,” is honored to feature Dr. Shah.

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

Dhiraj Shah: The most challenging part of my career was to sell the idea of broadening the horizon of vascular surgery. Starting as an underdog, I was almost alone in an academic department. Discussing nontraditional approaches in a barely recognized subspecialty at the time was ignored, especially in a relatively small town like Albany.

A second challenge was to recruit a group of talented vascular surgeons who can work together; this was tough, particularly within the constraints of the academic department in an unknown and small Albany Vascular section. You need a critical mass to help accomplish anything.

The most rewarding aspect of my career is the success of and future prospects at Albany Vascular. Nothing is more satisfying for me than to see that the Vascular Institute has grown so large and continues to grow. The group is in great hands, and that’s the professional reward I always wanted.

The other great satisfaction in my life is that all these goals were accomplished without much sacrifice. I have a wonderful family, a group of fantastic friends, partners and their families, and coworkers who have surrounded me all this time with support and friendship.

Mehta: Almost two decades ago, your vision for The Institute for Vascular Health and Disease was one of collaboration among all vascular specialists. What are your perspectives on how this will evolve over the next decade?

Shah: The development of The Institute of Vascular Health and Disease was highly meaningful. The basic desire was to create a system that will provide care for a growing disease without limitation, thus the need for a multispecialty approach. We have succeeded but an immense amount of work remains ahead of us. From a vascular health point of view, work needs to be done about raising awareness in the community around issues such as diet, nutrition, exercise, smoking cessation, and diabetes control.

The Center for Vascular Awareness has taken charge of the vascular awareness campaign unlike any other group. Also, vascular rehabilitation and aftercare are important aspects which have not yet been explored fully. We also have to work toward making vascular care easily accessible so that patients don’t have to wait for treatment. In addition research,
training, and perfecting existing therapies or making them better is a continuum.

As vascular disease gets more complex, a multispecialty approach becomes more crucial. We have recently seen the evolution of collaboration among cardiac and vascular specialists in transcatheter aortic valve replacement, a procedure that has offered hope for patients who were otherwise considered inoperable.

**Mehta:** You are considered one of the pioneers for maturing techniques of evasion carotid endarterectomy (CEA) for stroke prevention. How will the vascular specialist’s role evolve in managing patients with carotid artery stenosis?

**Shah:** Carotid artery stenosis and its treatment is most intriguing to me because it has undergone multiple stages of maturation but still has not reached the summit. We embarked on evasion CEA and retooled it to the current state when everyone else thought conventional CEA was so good that no improvement was necessary. That belief was not true.

The benefits of evasion CEA are not only the results, but also its simplicity; the procedure is easy to teach, easy to train, and easy to transfer. Is it the last solution? I don’t think so. Evolving techniques such as endovascular therapy have to work out all the details to make those procedures just as simple as CEA. At the present time, endovascular treatment for stroke prevention is cumbersome, technically demanding, and involves complexity, so that procedure is having trouble fighting against CEA. I’m sure it will change.

The Albany Vascular Group’s approach to our vascular specialty is somewhat similar to Shakespeare’s approach to literature—choose good materials, redo and refine them, make them likable, and then implement them into the community. We have done similar approaches for various other vascular surgery techniques including lower extremity in situ saphenous vein bypass and the retroperitoneal approach to abdominal aortic reconstruction, to name a few. Carotid stenting also lends itself to that kind of retooling, and we should pioneer that in addition to other endovascular therapy.

**Mehta:** What do you consider to be your most successful professional accomplishment?

**Shah:** The success of my professional life was being able to start a system that brought together a group of the most competent vascular specialists, and each one of them will become more successful than I have been.

**Mehta:** What is your advice for young vascular surgeons today?

**Shah:** Young vascular surgeons today should be omnipotent. After fundamental training in clinical competence, with a background in research and academics, they should develop a global view and approach to the vascular specialty, learn from and collaborate with others here and abroad, and continue to make the vascular specialty better. Those who want to make a difference should have very high goals and ambition, and then work toward achieving their dreams. If they are even partly successful, they will be better than what they are today. No goal is unachievable if one believes it.
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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