Establishing a Peripheral Vascular Center of Excellence

It's much more than just technology.

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A peripheral vascular disease (PVD) center of excellence in 2005 should diagnose and treat PVD and the associated disease processes that result in significant premature morbidity and mortality. The center should be a community resource, which helps provide education to the public and local health care providers regarding the impact of symptomatic and asymptomatic PVD. A true PVD center of excellence cannot exist without close cooperation and input from a true multidisciplinary "team" approach, which should include the surgeon, cardiologist, peripheral interventionalists, podiatrists, and specialists in vascular medicine, diabetes, nephrology, neurology, wound care, and vascular imaging, along with PVD-trained registered nurses, nurse practitioners, and physician assistants. Unquestionably, the first step in creating a PVD center of excellence is getting a true commitment or "buy-in" into this multidisciplinary team approach.

PVD, defined as noncoronary artery disease, is highly prevalent, underdiagnosed, undertreated, and significantly associated with coronary artery disease. Despite the now-recognized significant morbidity and mortality of PVD, myocardial infarction and its associated cardiac-related mortalities remain the leading cause of death in the PVD patient. This fact certainly underscores the importance of a multidisciplinary approach to evaluating and treating PVD, and providing a continuum of cardiovascular care. Even patients with asymptomatic PVD have a profoundly increased 5-year mortality when compared to patients without PVD; therefore, the public and all health care providers must be educated on

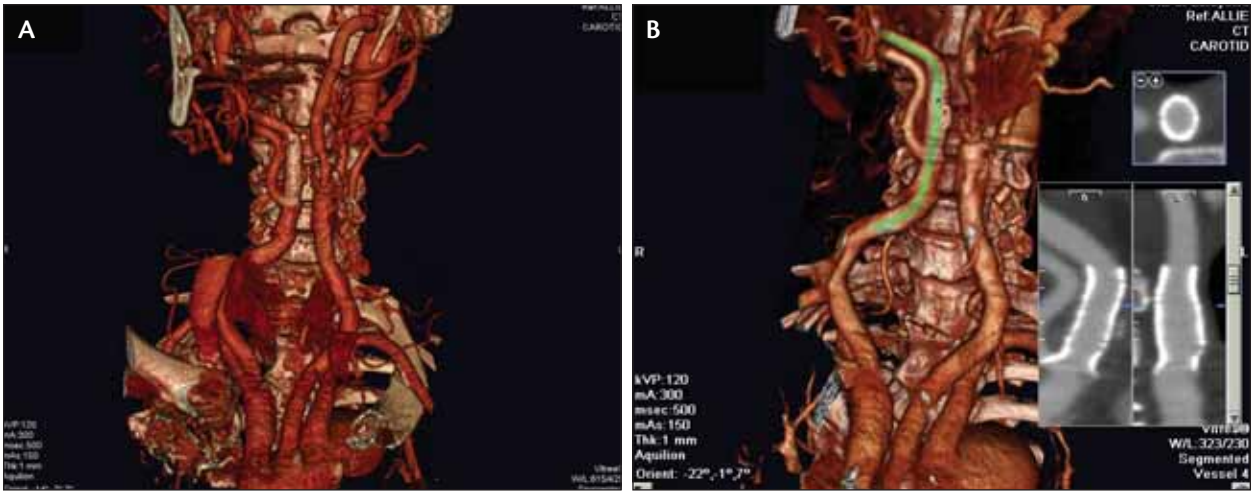

Figure 1. Sixteen-channel CTA demonstrating right ICA stent and detailed images of the distal left ICA (A). Green vessel probe demonstrates excellent flow through the stent (B, see inset).

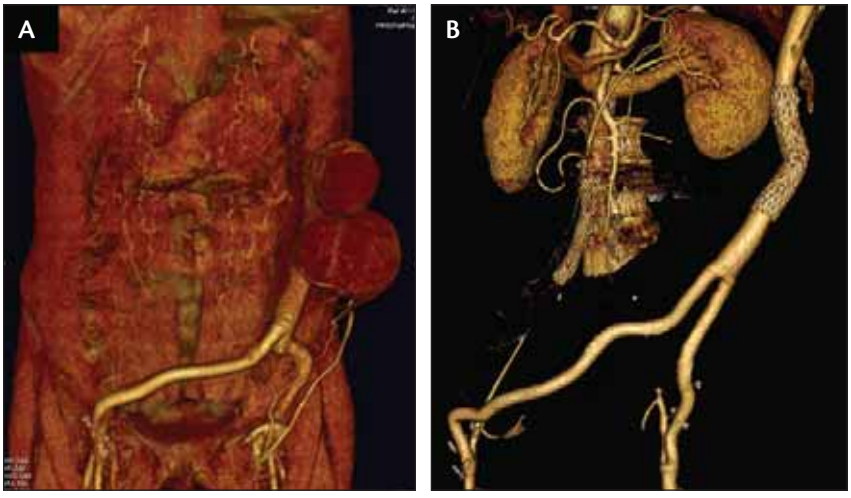

Figure 2. Three-dimensional thoracoabdominal bypass graft reconstruction demonstrating multiple soft tissue seromas "kinking" the graft (A). CTA after seromas were removed and stent grafting of the "kink." Note the detailed images of the graft (B).

the benefits of screening for PVD. Perhaps the ideal total cardiovascular or vascular center of excellence would include both the cardiac and PVD center of excellence concepts, but for the purposes of this discussion we will primarily concentrate on the peripheral vascular aspects of a center of excellence. The cardiology component must be emphasized because of the near 100% existence of global cardiovascular disease.

The PVD center of excellence has a unique opportunity and responsibility to educate its community on the emerging information and issues regarding the overall impact of PVD and the new treatments available. The first two key elements in creating a center of excellence are the development of the multidisciplinary team and a commitment to enhancing community cardiovascular awareness through education.

TECHNOLOGY ISSUES

The initial step in any cardiovascular diagnosis and treatment requires the public and clinicians first to be aware of the disease and have a low threshold for noninvasive evaluation, especially with the high incidence of asymptomatic cardiac and peripheral vascular disease. A simple ankle-brachial index (ABI) is perhaps the most cost-effective, simple screen for PVD, and even has a predictive and prognostic role in coronary artery disease. The following state-of-the-art technologies should be considered basic for a center of excellence in 2005:

- An accredited noninvasive vascular lab;
- Immediate access to noninvasive cardiology lab;
- 16-channel multidetector computed tomography angiography (CTA), which is rapidly becoming recognized as the noninvasive diagnostic tool of choice for most areas of PVD (Figures 1 and 2). The 32-40-64–channel CTA technologies will become available in 2005 and will significantly improve the noninvasive capabilities of cardiac and coronary artery disease diagnosis and facilitate treatment (Figure 3);
- Rapid access to high-quality magnetic resonance angiography (MRA) would further enhance the diagnostic capabilities of cardiac evaluations, but will add less value in the management of PVD. MRA has been of great value in evaluating infrapopliteal and pedal blood flow, but 16-channel CTA technology appears equally equivalent;
- High-quality PVD "endosuite" or endovascular angiography with a minimum of a 12-inch (preferably a 15-inch) image intensifier that has digital subtraction angiography (DSA) capabilities. This can be located in a radiology, cardiology, or surgery environment, depending on the institution. Several hybrid cath labs are now available and can be used for both coronary and peripheral imaging and interventions. High-quality imaging capabilities should be available that offer endovascular treatments for aneurysmal disease of the entire vascular system and innovative limb salvage interventions, both in the operative and nonoperative endosuites. Another exciting hybrid strategy is also being developed that would integrate the OR and cath lab and provide simultaneous open surgical and endovascular treatments for cardiovascular patients. These hybrid imaging and treatment capabilities will become increasingly important because more vascular surgeons, and now cardiac surgeons, will be obtaining catheter-based treatment skills; and
- Operating room capabilities for all traditional open cardiac, thoracic, and vascular surgical procedures.

CLINICAL ISSUES

The diffuse nature and high association of PVD with other medical conditions (ie, diabetes, renal disease, coronary disease, wound care) demand a multidisciplinary approach toward patient care at a PVD center of excellence. Every patient with PVD needs a multidisciplinary work-up and needs treatment. This treatment may be as simple as risk factor modification and follow-

up, medications, or complex treatments requiring interventional or surgical treatment. PVD is not benign! The following clinical resources should be readily available at a PVD center of excellence:

- Vascular surgery
- Cardiothoracic surgery
- Peripheral interventionalists (any discipline)
- Interventional and noninterventional cardiology
- Interventional and noninterventional radiology
- Vascular medicine
- Diabetology
- Podiatry and wound care
- Primary and secondary prevention and wellness (including lipidology and smoking cessation)
- Cardiovascular rehabilitation
- Dedicated cardiovascular screening program

The center of excellence should provide all traditional and newer innovative approved surgical, nonsurgical, interventional, and medical treatments. This multidisciplinary environment should be conducive to establishing innovative programs in carotid stenting, interventional treatments for global aneurysmal disease, PVD, structural heart disease treatment, and innovative limb-salvage techniques.

SPECIAL CLINICAL CONSIDERATIONS

Several additional clinical scenarios are well suited to benefit from a close association or being an actual component of a PVD center of excellence.

Wound Care Center

Critical limb ischemia (CLI) and amputations are increasingly recognized as a major health care problem, with significant clinical and economic costs. Emerging interventional technologies not available just 5 years ago are now available and responsible for improved limb salvage rates, even in advanced CLI. The interventional suite of 2005 should provide access to emerging CLI treatments, such as excimer laser, plaque excisional atherectomy, cryoplasty, CTO and re-entry technologies, mechanical thrombectomy devices, and the future array of technologies and pharmaceutical strategies that will be applicable to CLI. Many of these technologies are also applicable to global cardiovascular interventions. A wound care center and PVD center of excellence relationship would optimize outcomes in the CLI patient. Oftentimes, an ischemic or diabetic wound is the first manifestation of generalized cardiovascular disease, further underscoring the importance of this association. The leading referral to our Cardiovascular Institute of the South (CIS) PVD Center is from podiatry, and a podiatry consultation is the leading consultation made in our CIS hospitalized patients.

Acute Stroke Center

With the emergence of improved neuroradiology imaging and interventional technologies, it is likely that overall outcomes for patients with acute stroke would benefit from a close association with a community PVD center of excellence. Stroke prevention and screening should be basic to any center of excellence. The lack of widespread availability of interventional neuroradiology has precluded the development of acute stroke centers in most small- to medium-sized communities.

> "Every patient with PVD needs a multidisciplinary work up and needs treatment."

Venous Disease

Unfortunately, the public, clinicians, and industry alike have slowly recognized the prevalence and impact of venous disease. Recently, effective interventional treatment strategies have been developed to treat both acute and chronic venous disorders. Acute and chronic iliofemoral deep vein thrombosis, Padgett-Schroeder syndrome (axillo-subclavian effort thrombosis), May-Thurner syndrome (left iliac vein external compression), SVC syndrome, IVC thrombosis, pulmonary embolism, and dialysis AV graft access complications are examples of venous disorders that now can be treated with catheter-based technologies. Catheter-based treatments are now available for varicose veins and a variety of superficial venous disease. The PVD center of excellence of 2005 should provide traditional surgical and emerging interventional treatments for venous disease.

SPECIAL NONCLINICAL CONSIDERATIONS

Several nonpatient care recommendations deserve mention and are integral to successful program development. A successful PVD center of excellence requires strength in both clinical treatment and research, and individual leadership in both.

Research

Developing research initiatives brings many benefits to the center, including research grants and protocols, and can be an added revenue source; enhances relationships with industry; helps ensure a consistent stream of

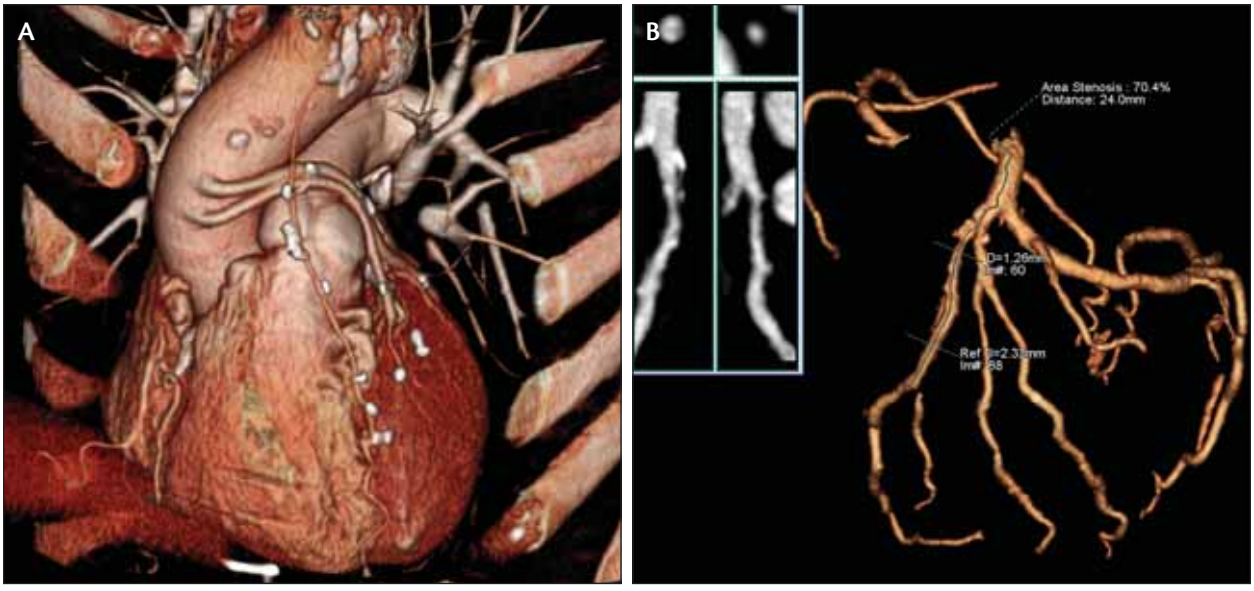

Figure 3. Sixty-four-channel cardiac CTA demonstrating patent vein bypass grafts to the diagonal and circumflex coronary arteries and left IMA to the LAD (A). Forty-channel left coronary artery system 3-D reconstruction demonstrating vessel size and percent stenosis quantification (B).

cutting-edge technologies and clinical trials; cost benefits; marketing benefits to differentiate the center from competing forces; interfaces well with education and training; potential for local and national recognition; potential for improved outcomes; and along with outcome reporting, becomes validating.

Clinical and Research Leadership

As in most successful endeavors, a champion is integral to success. Ideally, separate clinical and research directors and staff should be selected who act as codirectors of the center of excellence. The directors should form a partnership that fosters the goals of the overall center's development. These leaders must be able to create an environment of cooperation among the multidisciplinary team of specialists to promote education and facilitate research.

Outcomes Reporting

The cornerstone of any center of excellence concept should be optimal disease outcome management, which needs to be tracked and reported. The development of cost and clinically efficient critical treatment pathways are also at the core of the center of excellence strategy. Only with demonstrating and reporting quality clinical and cost outcomes management measurement data can a center demonstrate excellence. The successful development of a center of excellence can also become a powerful local marketing tool with significant added values.

CONCLUSION

Certainly, our patients have benefited greatly from new technologies, devices, and cardiovascular treatment strategies, and these are integral to improving outcomes, but they do not ensure a successful cardiovascular center of excellence. The creation of a true multidisciplinary team approach is at the very core of the center of excellence concept. Perhaps when creating any center of excellence, the first technology to get right is the "human technology." ■

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