M. Davies, M.D.

OVERVIEW OF VENOUS DISEASE

Mark G. Davies, M.D., Ph.D., M.B.A.
Methodist DeBakey Heart & Vascular Center, Houston, Texas

Recognition of venous disorders as a significant public health issue has increased awareness of venous problems among both the medical professions and the lay population. This has resulted in a greater attention to prevention, introduction of quality performance measures, and enhanced technical operative and pharmacological interventions that have transformed the treatment of venous disease from a stepchild of several specialties to a robust medical subspecialty. Venous problems may be categorized into acute and chronic venous disorders.

Acute venous disorders comprise the spectrum of deep venous thrombosis (DVT), superficial venous thrombophlebitis, and venous trauma.[1] Deep venous thrombosis has a variable estimated incidence of 56 to 160 cases per 100,000 per year and appears to be linked with the convergence of multiple genetic and acquired risk factors. It is a significant problem in hospitalized patients. Acute venous thrombosis is followed by an inflammatory response in the thrombus and vein wall, leading to thrombus amplification, organization, and recanalization, which results in structural defects within the wall and in turn leads to luminal compromise and valvular dysfunction. Clinically, there is an exponential clearance of the thrombus by the body's inflammatory and fibrinolytic systems over the first six months, with most recanalization occurring over the first six weeks after thrombosis. Pulmonary embolism (PE) and post-thrombotic syndrome (PTS) are the most important acute and chronic complications of DVT.

Due to the known risk profiles and ease of pharmacological intervention, thromboembolism prophylaxis is the standard of care, but appropriate measures are utilized in as few as one-third of at-risk patients. DVT may present as fever or tachycardia, as leg swelling or pain, or as cardiopulmonary events secondary to acute pulmonary embolism. Duplex imaging and D-Dimer testing remain integral to DVT imaging and diagnosis. Ventilation-perfusion (V/Q) scans and computed tomography angiography (CTA) of the chest are the most common modalities employed to diagnose pulmonary embolism. Once diagnosed, anticoagulation constitutes the mainstay of DVT management, with the goal of preventing recurrent venous thromboembolism. However, anticoagulation is not a protection against PTS because the valves and vessel wall are damaged as the thrombus is cleared by the body. Most recent guidelines recommend catheter-directed thrombolysis or combined pharmaco-mechanical thrombectomy for proximal DVT in the mobile and functional patient with no absolute contraindications to the administration of lytic drugs. Effective lysis of these DVTs can reduce post-thrombotic symptoms and improve quality of life. Inferior vena caval filters continue to have a role among patients with contraindications to, complications of, or failure of anticoagulation. Temporary filters placed for prophylaxis should be followed and removed within the recommended intervals.

The incidence of superficial venous thrombophlebitis is underreported and considered to occur in approximately 125,000 patients per year in the United States. For lesions not encroaching on a deep-system vein, conservative measures are adequate. For those lesions that encroach on a deep vein, recent investigations suggest that anticoagulation may be more effective than ligation in preventing DVT and PE. Venous injuries are similarly underreported, and current recommendations include repair or bypass of an injury to a major proximal vein. If repair is not safe or possible, ligation should be performed.

Chronic venous disease continues to be a common medical problem in Western Europe and the United States.[2] Reported prevalence ranges from 1% to 40% in females and from 1% to 17% in males. Estimates for varicose veins are higher, ranging from 1% to 73% in females and 2% to 56% in males. While many risk factors have been associated with chronic venous disease, older age, female gender, pregnancy, family history of venous disease, obesity, and occupations associated with orthostasis are the most commonly quoted.

Chronic venous disease can be divided into primary and secondary chronic disorders. Primary chronic venous disorders, or those not associated with an identifiable mechanism of venous dysfunction, are among the most common venous problems.[3] Varicose veins without skin changes are present in about 20% of the population while active ulcers may be present in as many as 0.5%. These problems are caused by intrinsic structural and biochemical abnormalities of the vein wall that with progression lead to skin changes and ulceration. This progression arises from extravasation of macromolecules and red blood cells, leading to endothelial cell activation, leukocyte diapedesis, and altered tissue remodeling with intense collagen deposition. Patients may remain asymptomatic or develop pain or swelling, skin changes, or a complication (thrombophlebitis, bleeding, ulceration). While physical exam allows for the identification of varicosities and saphenofemoral incompetence, venous duplex ultrasonography is the most common study used to define the function of the superficial and venous systems in the lower extremities.

Primary venous disease is most often associated with truncal saphenous venous insufficiency. Until recently, these veins were treated by stripping the saphenous vein and interrupting and removing major tributary and perforating veins. However, endovenous ablation techniques with radiofrequency, laser, or foam sclerotherapy are now the norm. Sclerotherapy and cutaneous laser treatment are used in the management of telangiectasias; primary, residual, or recurrent varicosities without connection to incompetent venous trunks; and congenital venous malformations.

Secondary chronic venous disorders are those venous problems that occur following an episode of acute deep venous thrombosis.[4] Most occluded venous segments recanalize over the first six to 12 months after an episode of acute DVT, leading to chronic luminal changes and a combination of partial obstruction and reflux. These intrinsic changes lead to venous hypertension. The clinical manifestations of secondary chronic venous disease, including pain, venous claudication, edema, skin changes, and ulceration are commonly referred to as the post-thrombotic syndrome. The diagnostic evaluation of secondary chronic venous disorders is similar to primary chronic venous disorders, although the use of venography and intravascular ultrasound is more prominent as intervention to correct structural changes in veins is more common. In general, however, compression remains the primary treatment of chronic venous disorders and is essential to heal ulcers and minimize recurrence. The efficacy of various adjuncts to ulcer treatment, including complex wound dressings and medications, have been variable. Although superficial venous surgery has not been demonstrated to improve ulcer healing rates, it does decrease ulcer recurrence.

Treatment of incompetent perforating veins remains controversial and appears to be appropriate for venous ulceration. With respect to venous obstruction, iliocaval angioplasty and stenting have emerged as the primary treatment for proximal iliofemoral venous obstruction, with surgical bypass assuming a secondary role.

References

1. Meissner MH, Wakefield TW, Ascher E, Caprini JA, Comerota AJ, Eklof B, Gillespie DL, Greenfield LJ, He AR, Henke PK, Hingorani A, Hull RD, Kessler CM, McBane RD, McLafferty R. Acute venous disease: venous thrombosis and venous trauma. J Vasc Surg. 2007 Dec;46 Suppl S:25S-53S.
2. Beebe-Dimmer JL, Pfeifer JR, Engle JS, Schottenfeld D. The epidemiology of chronic venous insufficiency and varicose veins. Ann Epidemiol. 2005 Mar;15(3):175-84.
3. Meissner MH, Gloviczki P, Bergan J, Kistner RL, Morrison N, Pannier F, Pappas PJ, Rabe E, Raju S, Villavicencio JL. Primary chronic venous disorders. J Vasc Surg. 2007 Dec;46 Suppl S:54S-67S.
4. Meissner MH, Eklof B, Smith PC, Dalsing MC, DePalma RG, Gloviczki P, Moneta G, Neglén P, O' Donnell T, Partsch H, Raju S. Secondary chronic venous disorders. J Vasc Surg. 2007 Dec;46 Suppl S:68S-83S.