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Pathophysiology and diagnosis of deep venous thrombosis.

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Lower-limb deep venous thrombosis (DVT) affects between 1% to 2% of hospitalized patients. These thrombi disrupt the vascular integrity of the lower limbs and are the source of emboli that kill approximately 200,000 patients each year in the United States. The causes of thrombosis include vessel wall damage, stasis or low flow, and hypercoagulability. These factors favor clot formation by disrupting the balance of the opposing coagulative and fibrinolytic systems. The symptoms and signs of venous thrombosis are caused by obstruction to venous outflow, vascular inflammation, or pulmonary embolization. About 70% of patients referred for clinically suspected venous thrombosis, however, do not have the diagnosis confirmed by objective testing. Among the 30% who have venous thrombosis, about 85% have proximal vein thrombosis, and the remainder have thrombosis confined to the calf. Physicians cannot rely on signs and symptoms to make the diagnosis of DVT and must depend on imaging studies to guide treatment. Patients with proximal vein thrombosis who are inadequately treated have a 47% frequency of recurrent venous thromboembolism over 3 months. In contrast, clinically detectable recurrence occurs in less than 2% of patients with proximal vein thrombosis if an adequate anticoagulant response is achieved. Of the diagnostic procedures for DVT, venography is the only invasive test of proven value, and ultrasonographic (US) studies are the most commonly used noninvasive modaity. Other procedures are occasionally used to diagnose DVT, including impedance plethysmography, computed tomography, and magnetic resonance imaging. US examinations are noninvasive, they are rapidly obtained, and they can be performed serially. In symptomatic patients, venous US is sensitive and specific for proximal DVT; however, US is insensitive to calf vein thrombosis and to asymptomatic DVT occurring after surgery. Patients with symptoms of recurrent DVT also can present a difficult diagnostic problem. Only about 20% to 30% of these individuals actually have the disease; the rest have symptoms arising from chronic venous insufficiency or from any of the causes of lower extremity pain. After an acute episode, up to 50% of patients have compression ultrasound abnormalities for 6 months that are indistinguishable from the original findings of DVT. Hence, there are a significant number of patients and clinical circumstances in which the diagnosis of DVT is difficult. 99mTc-radiolabeled peptides that target the molecular biology of thrombosis should aid in the management of the disease, particularly in asymptomatic patients at high risk, in patients with recurrent symptoms, in patients with active DVT in the calf and/or pelvis, and in patients with intermediate- or low-probability lung scans.

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