

Ultrasound Assessment of Venous Thrombosis

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Ultrasound has replaced all other modalities for confident diagnosis of deep or superficial venous thrombosis. Deep vein thrombosis (DVT) most commonly commences in below-knee veins and approximately 10% propagate to above-knee veins. If a scan for DVT is positive then some 20% are bilateral. If the initial scan is negative, conversion to a positive scan is extremely unlikely. A large proportion of patients with DVT are asymptomatic and presentation may be with a pulmonary embolus (PE) although some 40% of patients with PE confirmed by CT angiography have a negative lower limb DVT scan. It is acceptable to perform a D-Dimer test as the first investigation, for a negative result can allow ultrasound examination to be deferred to a convenient time without the need for anticoagulation in the interim.

A DVT may recanalise with restoration of valve function or destruction of valves, or the vein may remain permanently occluded. Approximately 50% of patients with a major DVT develop symptoms of the post-thrombotic syndrome within 10 years and about 5-10% eventually develop venous ulceration. If a scan is positive for DVT then serial scans are required to determine whether or not there is early propagation and later recanalisation. Later recurrence of symptoms requires repeat scanning to determine whether or not there is further fresh thrombosis. The duration for treatment with anticoagulation after deep vein thrombosis is arbitrary with warfarin usually discontinued at 3-6 months. A D-Dimer test shortly before proposed cessation may help to determine whether to continue or not depending on whether it is positive or negative. A final ultrasound scan should be performed when treatment is ceased to allow a baseline to compare for findings if there is suspected later recurrence.

Normal veins are easily compressible, larger than the corresponding artery, and smooth walled with an echo free lumen, while colour Doppler shows flow with distal augmentation and phasic flow with respiration or cessation of flow with the Valsalva maneuver in proximal veins. Acute thrombosis causes loss of compressibility, increased vein diameter and echogenic thrombus in the lumen, while colour Doppler shows loss of flow with augmentation or loss of phasic flow with respiration. Chronic thrombosis is demonstrated by more marked thrombus echogenicity and wall thickening, reduced vein diameter, and recanalisation or collateral flow. Deep vein occlusion following ultrasound-guided sclerotherapy has more the appearance of chronic thrombus with marked hyperechoic material in the lumen.