

DIAGNOSIS OF DEEP VEIN THROMBOSIS IN THE LEG BY USING COLOUR CODED DUPLEX SONOGRAPHY

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Background: Deep Vein Thrombosis (DVT) is regarded rare. Asia. There is no documentation of the incidence of DVT in Pakistan. Clinical diagnosis of Deep Vein Thrombosis is inaccurate. Venography is the most reliable method of diagnosis, but it has several disadvantages. Many non-invasive diagnostic methods have therefore been developed in the past decade. Of these only duplex sonography has comparable accuracy. **Methods:** We studied 100 cases of suspected DVT by using colour coded duplex sonography. We report the results of a prospective study in patients with suspected deep vein thrombosis evaluated by both colour coded Doppler sonography and venography. **Conclusion:** We conclude that colour coded duplex sonography is a highly accurate, simple, non-invasive method for detecting femoropopliteal thrombosis. Additional venography is not necessary. its value in diagnosing isolated calf vein thrombosis remains to be established.

INTRODUCTION

DVT is very common in the western countries, but it is very rare in the Asian Subcontinent¹". The incidence of DVT in Pakistan has been never studied before. DVT is regarded asymptomatic in about 50% of patients. If diagnosed earlier the morbidity and mortality can be reduced by early treatment⁴. The role of colour coded duplex sonography was studied in our 100 patients with clinically suspected deep vein thrombosis.

MATERIALS & METHODS

We studied 100 inpatients and outpatients with clinically suspected deep vein thrombosis. Twelve postoperative inpatients had been given anticoagulant drugs for one to six days. The other 88 patients had started receiving intravenous heparin after admission.

In all patients colour coded duplex sonography and venography were performed within 24 hours. Sonography was performed with a 5 MHz phase array transducer. The femoral and popliteal veins were examined with the patient in a supine position.

The calf veins were not investigated.

We assessed the compressibility of the vein by pressing the transducer on it in a transverse section; the phasicity of flow during deep inspiration and expiration; and whether there was an echogenic thrombus. Five patients underwent both procedures on both legs. Sonography and venography were performed and the results interpreted independently by different investigators in the surgical and radiology units respectively, For sonography the diagnostic criteria for deep vein thrombosis were incompressibility of the vein, absence of flow phasicity, and presence of an echogenic thrombus.

Venography was performed and interpreted according to Rabinov and Pauline.

The table gives the results. In addition, eight patients were diagnosed as having isolated calf vein thrombosis on venography. In one of these there was absent flow phasicity in the popliteal vein, but in the remaining seven the diagnosis could not be made on sonography.

RESULTS

Our results are summarized in table-1 where we have shown comparison of results of colour coded duplex sonography and venography in patients with suspected femoropopliteal vein thrombosis and sensitivity, specificity, and negative predictive values of colour coded duplex sonography at 95% confidence intervals.

DISCUSSION

As deep vein thrombosis cannot be diagnosed accurately by clinical examination alone and venography is invasive and sometimes contraindicated, a reliable non-invasive method is needed to confirm the diagnosis and indicate treatment with oral anticoagulant or even thrombolytic drugs. A recently developed technique, colour coded duplex sonography, offers simultaneous visualization of real time B-mode images and flow by pulsed colour coded Doppler sonography.

In our study the best diagnostic criterion was incompressibility. The only false negative result was during the early phase of the study in a patient with a thrombus limited 'to the adductor canal. Since that case no further isolated adductor canal thrombosis has been missed by accurate examination of this region. This confirms other reports that the

Table-1: Comparison of results of colour coded duplex sonography and venography in patients with suspected femoropopliteal vein thrombosis & sensitivity, specificity, and negative predictive values of colour coded duplex Sonography (95% confidence in intervals).

		Colour coded duplex sonography (n=100)								
		Vein incompressibility			Absence of flow phasicity			Visualization of thrombus		
		Positive	Negative	Total	Positive	Negative	Total	Positive	Negative	Total
Venography	Positive		1	55	52	3	55	48	7	55
	Negative		39	39		39	39		39	39
	Total	54	40	94	52	42	94	48	46	94
Sensitivity		98% (90 to 100%)			95% (85 to 99%)			87% (76 to 95%)		
Specificity		100% (91 to 100%)			100% (91 to 100%)			100% (91 to 100%)		
Positive predictive value		100% (93 to 100%)			100% (93 to 100%)			100% (93 to 100%)		
Negative predictive value		98% (87 to 100%)			93% (81 to 99%)			85% (71 to 94%)		

assessment of vein incompressibility is the most reliable criterion for deep vein thrombosis. Colour coded visualization of venous flow has considerable diagnostic advantages in that it more successfully detects a non-occlusive free floating thrombus with visible flow around it, which is known to be a high risk for thromboembolism. Moreover, a fresh hypo echogenic thrombus may be misinterpreted by conventional duplex sonography^{5,1}. Another advantage is the quick and reliable identification of vascular structures, especially in the popliteal fossa, where accessory veins are not easily distinguishable from other structures. Colour coded duplex sonography can be performed at the bedside, is time sparing, and permits diagnosis of other abnormalities that mimic deep vein thrombosis - for example, haematoma, Baker's cyst, and neoplasm⁸.

We conclude that colour coded duplex sonography is a highly accurate, simple, non-invasive method for detecting femoropopliteal thrombosis. Additional venography is not necessary. Its value in diagnosing isolated calf vein thrombosis remains to be established.

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