Hospital Topics

Impact of venography on the diagnosis and management of deep vein thrombosis

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Abstract

In general medical patients presenting with suspected deep vein thrombosis routine use of x ray venography was associated with a large fall in the proportion of patients with a final diagnosis of deep vein thrombosis, from 83% to 25% ($p < 0.001$), and with an appreciable shortening of hospital stay, from 13.6 to 7.2 days. The diagnosis of deep vein thrombosis was rejected in only 4% of patients when a venogram was not performed, and it is estimated that two patients were treated with anticoagulants unnecessarily for every patient treated correctly. The risk, expense, and inconvenience of unnecessary anticoagulant treatment far exceeds the risk, expense, and inconvenience of performing venograms routinely. The common practice of misdiagnosing deep vein thrombosis clinically should be abandoned.

Introduction

When deep vein thrombosis is suspected clinically the diagnosis is correct in only half of all patients,¹⁻⁵ and the proportion is even lower in those presenting to physicians rather than surgeons.⁶⁻⁷ The clinical features do not distinguish those with from those without venous thrombosis,⁶⁻⁷ so some objective method of diagnosis is essential for accuracy of diagnosis and also for cost effective management.⁸ These facts seem beyond dispute, but a recent survey of consultants in Scotland showed that 47% of them were still diagnosing (or misdiagnosing) deep vein thrombosis clinically.⁸ From personal observation it is evident that the art of clinical misdiagnosis also thrives in England, even in major teaching centres. X ray venography has been considered the basic clinical tool for diagnosis and management decisions and the only acceptable method for the diagnosis of existing thrombosis,⁹ but those who use venography routinely tend to be regarded as mildly eccentric by many colleagues, clinicians and radiologists alike. This survey examined the impact of venography on the diagnosis and management of deep vein thrombosis in general medical patients.

Methods

The records of all patients admitted to a general medical firm of 20 beds over the seven years 1974-80 were examined. Referral and

admission policies had not altered over this period but the policy for diagnosing deep vein thrombosis had. From 1974 to 1977 venograms had been performed in a minority (29%) of patients, whereas in 1978-80 the diagnosis was never accepted or rejected without venography. All patients admitted with suspected deep vein thrombosis were identified. Those in whom pulmonary embolism was also suspected and those developing possible deep vein thrombosis after admission were excluded. Age, sex, factors predisposing to venous thrombosis (bed rest, oestrogens, neoplasm), results of venography if performed, final diagnosis, treatment, complications of venography or anticoagulants, and duration of stay in hospital were extracted from the case records. The results were examined by chi-square with Yates's correction.

Results

Admissions for suspected deep vein thrombosis did not vary appreciably in number over the seven years, with an average of seven patients (range 4-10) a year. Those admitted in 1974-7 (venography not routine) did not differ appreciably from those admitted in 1978-80 (venography routine) in age, sex, or factors predisposing to venous thrombosis (table). The final diagnosis was deep vein thrombosis in

Clinical features of patients admitted with suspected deep vein thrombosis in 1974-7 when venography was not routine; and in 1978-80 when venography was routine. (Mean (and range) data)

	1974-7	1978-80
No of patients	35	16
No of venograms	10 (29%)	16 (100%)
Age (years)	54 (18-77)	54 (20-74)
Sex (M:F)	75	129
Predisposed to DVT†	8 (23%)	2 (13%)
Signs in calf alone	31 (89%)	12 (75%)
Signs in calf plus thigh	4 (11%)	4 (25%)
DVT diagnosed*	29 (83%)	4 (25%)
Hospital stay (days)	13.6 (1-58)	7.2 (1-23)
Hospital stay ≤ 3 days**	4 (11.4%)	8 (50.0%)

* $\chi^2 = 13.7$, $p < 0.001$; ** $\chi^2 = 7.1$, $p < 0.01$ for difference between groups.

†Bed rest, oestrogen use, malignancy.

83% of patients (29/35) during the period when venography was not routine but in only 25% of patients (4/16) when venography was performed routinely ($\chi^2 = 13.7$, $p < 0.001$). With routine venography 50% of patients were discharged within three days compared with 11% when venography was not routine ($\chi^2 = 7.1$, $p < 0.01$). During 1974-7 the diagnosis of deep vein thrombosis was rejected in only six patients, and in five of them the reason was a negative venogram. In all 51 patients the diagnosis was rejected in only 4% patients (1/25) when a venogram was not performed, whereas it was rejected in 69% patients (18/26) after venography. Without venography the average stay in hospital was 14.5 days, and no patient was discharged within two days; with venography the average stay was 6.8 days, and 46% were discharged within two days. The only complication from 29 venograms (three were bilateral) was local pain in one patient. Of 32 patients treated with anticoagulants, two had important bleeding while in hospital—one rectal bleeding and one haemorrhage into thigh muscles.

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Discussion

X ray venography identifies at least 95% of clinically important venous thrombosis in the legs⁹ but may have a false positive rate of 5-10% depending on the skill and experience of the radiologist. The results of this survey suggest that only 31% of patients presenting to general physicians with suspected deep vein thrombosis do in fact have venous thrombosis, which is in agreement with the 33% reported by Simpson *et al*⁷ in a prospective study of similar patients. In their study 42% of patients had other identifiable conditions such as Baker's cyst, muscle tear, cellulitis, and superficial thrombophlebitis, while no diagnosis could be reached in 25% of patients. Note that a diagnosis of Baker's cyst does not exclude deep vein thrombosis as the two conditions coexist not infrequently.^{7 10} From their survey of diagnostic practice Prentice *et al*⁸ concluded that many patients must have been treated with anticoagulants when venous thrombosis was in fact absent. The present survey confirms that the diagnosis of deep vein thrombosis was rarely rejected when venography was not performed. Given that the true prevalence of deep vein thrombosis in these patients is about 33%, two patients were treated with anticoagulants unnecessarily for every patient treated with anticoagulants correctly. The present survey also shows that the use of venography shortened the average stay in hospital from 15 days to seven, and it could have been reduced further had venography been readily available on a day case basis.

It is worth considering briefly the penalties of diagnosing deep vein thrombosis inaccurately. If it is diagnosed when it is in fact absent, which seems to be the common error, the consequences include a prolonged stay in hospital and the considerable risk,^{11 12} inconvenience, and expense of unnecessary anticoagulant treatment. Anticoagulant treatment will be continued for longer than six weeks in 73% of patients and for longer than three months in 29%.⁸ The misdiagnosis can have important implications for methods of contraception, for future pregnancies, and for any subsequent operation or illness that requires bed rest. Older patients without any predisposition to venous thrombosis may be subjected to extensive investigation because an underlying malignancy is suspected. Finally, further episodes of pain in the legs or chest will be regarded with deep suspicion, and repeated episodes may even lead to life long anticoagulation for venous thrombosis that never existed. Failure to diagnose deep vein thrombosis when it is in fact present appears to be an uncommon error in patients presenting in this way. The risks would be those of pulmonary embolism, extension of the thrombosis, and the postphlebotic limb.

In comparison the risks, inconvenience, and expense of using an objective method of diagnosis seem trivial. The main objection to the routine use of venography appears to be its invasive nature and the fear of serious adverse effects, but these are extremely uncommon^{5 9} and ought to be set against the much higher risk of serious bleeding during unnecessary anticoagulation.^{11 12} The only acceptable and thoroughly validated alternative to venography is the combination of a method that detects proximal thrombosis (ultrasound or impedance plethysmography) with ¹²⁵I-fibrinogen uptake, which detects thrombosis in the calf. In expert hands such a combination has false positive and false negative rates of about 8%,⁵ but it rarely misses the more dangerous proximal thrombosis.⁵ Its main disadvantages are the need for three days to complete the investigation and the fact that the equipment and skill may not be available in all hospitals.

When examining a patient with suspected deep vein thrombosis general physicians should have the following facts in mind:

(1) The odds are 2:1 against deep vein thrombosis actually being present.

(2) Clinical evaluation does not change these odds.

(3) A decision to treat all patients with anticoagulant drugs exposes two thirds to the considerable risk and inconvenience of unnecessary treatment and to serious remote consequences of the misdiagnosis. In addition this plan of management is not cost effective.

(4) When used alone ultrasound, impedance plethysmography, and ¹²⁵I-fibrinogen uptake are unsatisfactory diagnostic methods.

(5) X ray venography is rapid, accurate, and cost effective. The risk and expense of venography are greatly outweighed by the risk and expense of unnecessary anticoagulation.

(6) Deep vein thrombosis should not be diagnosed or excluded without objective confirmation either by venography or by a combination of methods that detect proximal and calf thrombosis—for instance, ultrasound plus ¹²⁵I-fibrinogen uptake.

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Is the anthelmintic levamisole of any value in the treatment of recurrent aphthous ulceration of the mouth? I have a 9 year old child in my care with persistent mouth ulcers of aphthous type.

Recurrent oral ulceration (recurrent aphthous stomatitis) affects the mucous membranes of the mouth and in a few individuals may cause severe, deep, and painful ulcers that are distressing and occasionally disabling. Recurrent oral ulcers are associated with deficiency of a haematinic—for instance, iron, folate, or vitamin B12—or with systemic disease such as Crohn's disease, coeliac disease, or Behçet's syndrome, but most cases are unexplained. Levamisole is an anthelmintic that also has a pronounced immunostimulatory effect, on both humoral and cellular immune responses. It has been used in a wide variety of clinical conditions, especially in an attempt to enhance defence mechanisms against malignant disease and in the treatment of rheumatic diseases. Its role in the management of recurrent oral ulcers is still speculative. Clinical trials have given conflicting results; some have suggested an effect while others have found that the drug is no better than a placebo. Since nausea and disturbances of taste and smell are recognised side effects and occasional patients develop neutropenia, agranulocytosis, or vasculitis, levamisole should probably not be used (except as a drug of last resort) in the management of oral ulcers, which although uncomfortable are not in themselves life threatening. Attention to general oral hygiene and the use of tetracyclines or corticosteroids locally are probably as effective as any other treatment, and although they do not prevent ulcers, they seem to reduce their frequency and severity.—M J TARLOW, senior lecturer in paediatrics, Birmingham.

Miller MF. Use of levamisole in recurrent aphthous stomatitis. *Drugs* 1980;**19**:131-6.