

DETECTION OF DEEP VEIN THROMBOSIS BY ^{99m}Tc -SULFUR COLLOID IN 24 CASES

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ABSTRACT

Scintigrams of the legs were recorded by computed scinticamera after antecubital injection of ^{99m}Tc -sulfur colloid in 24 patients with suspected deep vein thrombosis. Contrast venogram were taken after the scan 1 hour to 1 day. Of 15 patients with confirmed deep venous thrombosis, 11 had positive scans. Of 9 patients with normal venograms, 8 had negative scintigrams. Rate of accuracy read by physician was 79% and rate of accuracy analysed by computer was 83%. The risk and discomfort of contrast studies may be eliminated by the nuclear method.

INTRODUCTION

The uptake of ^{99m}Tc -sulfur colloid by venous thrombosis is well documented.¹⁻⁹ Recently Bardfeld et al.⁹ have verified that injection of ^{99m}Tc -sulfur colloid into an arm would be a feasible method of detecting deep vein leg thrombosis. Based on reports which suggested that contrast media used for venography might damage the intima of the vein and produce thrombosis,¹⁰⁻¹⁵ we decided to study 24 patients with suspected deep vein thrombosis using Bardfeld's method.

However, we used contrast venography as a standard method. Our experiment was a somewhat more advanced than Bardfeld's series for we compared the result of scintiphotos as interpreted by a physician in nuclear medicine to more rigid computer analysis and contrast venography.

METHODS

Twenty four patients without varicose veins scheduled for venography were sent to section of

Nuclear Medicine by a surgeon. All had normal liver function, otherwise bone marrow uptake might be misleading. Eight mCi (~300 MBq) of ^{99m}Tc -sulfur colloid was injected via an arm vein. Thirty minutes to an hour later scintiphotos of anterior views from thighs to ankles were obtained with a large field of view gamma camera. We preset 100,000 counts and only two images could cover the area from thighs to ankles. The scintigrams alone were interpreted by a physician in nuclear medicine. The data of both legs were also stored on a computer. Equal areas of interest were selected on left and right legs. If the uptake in one leg was greater than that in another leg by 20% the scan was considered positive. Contrast venograms were obtained 1 hour to 1 day after scintigraphy.

RESULTS

The radionuclide studies which were interpreted by a nuclear medicine physician, by a computer, and contrast venograms were compared

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TABLE 1
Summary of Patient Data

Patient	Age (yr) and sex	Clinical History	Scintigram Read by		Venogram and Final Diagnosis
			Physician	Computer	
1. S.S.	56 M	Category ***4, definite positive femoral VT* of the left leg	Increased activity in the left thigh	Positive	Left popliteal VT extending into femoral vein
2. B.P.	58 M	Category 1, equivocal signs, iliofemoral VT of the right leg	Normal	Normal	No evidence of DVT**
3. D.P.	30 F	Category 1, equivocal signs, femoral VT of the right leg	Normal	Normal	No evidence of DVT
4. Y.K.	65 M	Swelling and pain of the left thigh post operation	Increased activity in the left thigh and calf	Positive	DVT in the left thigh and calf
5. A.M.	48 M	Category 1, equivocal signs, femoral VT of the left leg	Normal	Normal	No evidence of DVT
6. L.T.	43 F	Category 1, definite positive femoral VT of the right leg	Thrombosis of the right leg	Positive	Posterior tibial vein thrombosis
7. S.C.	24 F	Inferior vena cava obstruction, middle portion, due to lymphoma	Normal	Normal	No evidence of DVT, lymphatic obstruction
8. K.U.	68 M	Category 5, definite positive, iliofemoral VT of the left leg	Normal	Positive	Extensive DVT
9. C.P.	42 F	Category 1, equivocal signs, femoral VT of the right leg	Normal	Normal	No evidence of DVT
10. L.C.	43 F	Category 1, definite positive, femoral VT of the left leg	Venous thrombosis of the left leg	Positive	Popliteal VT
11. S.T.	26 F	Category 1, equivocal signs, femoral VT of the right leg	Normal	Normal	Occlusion of anterior tibial vein
12. S.P.	30 F	Category 3, equivocal signs, iliofemoral VT of the left leg	Normal	Normal	Ilio-femoral VT of the left leg
13. C.L.	62 M	Category 4, equivocal signs, iliofemoral VT of the right leg	Normal	Normal	Ilio-femoral VT of the right leg
14. P.C.	64 M	Category 1, equivocal signs, femoral VT of the left leg	Normal	Normal	Normal
15. B.S.	44 M	Category 1, definite signs, iliofemoral VT of the left leg	Probable venous thrombosis of the left lower extremity	Positive	DVT of the left leg

Patient	Age (yr) and sex	Clinical History	Scintigram Read by		Venogram and Final Diagnosis
			Physician	Computer	
16. S.C.	69 M	Category 1, definite signs, iliofemoral VT of the left leg	Positive at the left leg	Positive	DVT of the left leg
17. S.Y.	31 F	Category 1, equivocal signs, femoral VT of the right leg	DVT of the right leg	Positive	DVT of the right leg
18. S.Y.	28 M	Category 1, equivocal signs, iliofemoral VT of the left leg	Probable DVT of the	Positive	Ilio-femoral VT of the left leg
19. W.T.	53 F	Category 5, equivocal signs, iliofemoral VT of the left leg	Probable DVT of the left leg	Positive	Normal
20. S.T.	74 F	Category 4, equivocal signs, femoral VT of the left leg	Normal	Normal	No evidence of DVT
21. W.T.	39 M	Category 5, equivocal signs, Cellulitis of the right leg	Normal	Normal	No evidence of DVT
22. B.K.	32 M	Category 1, equivocal signs, femoral VT of the left leg	Evidence of DVT	Positive	Ilio-femoral vein of the left leg
23. C.P.	51 M	Category 5, equivocal signs, iliofemoral VT of the right leg	DVT of the right leg	Positive	Right femoral vein thrombosis
24. B.P.	75 M	Category 5, equivocal signs, femoral VT of the right leg	DVT of the right leg	Positive	Thrombosis of posterior tibial vein

VT* = venous thrombosis

DVT** = deep venous thrombosis

Category*** = Categories for patients with clinical diagnosis of deep vein thrombosis

Category 1 : Ambulant patient presenting with pain and/or swelling of calves, without previous illness

Category 2 : Proved or suspected pulmonary embolus

Category 3 : Calf pain or swelling of limb after delivery

Category 4 : Calf pain or swelling of limb after surgery

Category 5 : Calf pain or swelling after rest for medical illness



Fig.1 A

Fig.1.(A) A patient developed swelling and echymosis after the injection of contrast medium at the dorsum of the left foot.

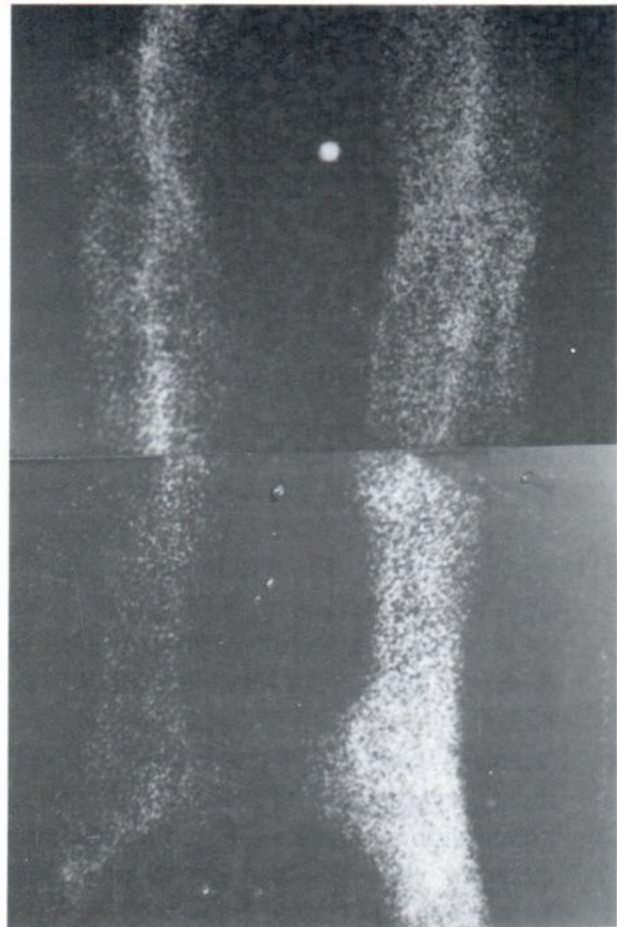


Fig. 1 B

Fig. 1(B) ^{99m}Tc-sulfur colloid scintigrams show higher uptake by the left leg. The bright spot is a marker placed between the knees of the patient. The ratio of the average uptake of ^{99m}Tc-sulfur colloid at the lower part of lt. Leg and right foot was 1:1.8

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