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RADIONUCLIDE VENOGRAPHY

The article by Henkin, et al on radionuclide venography (*1*) discusses the need for a simple, low-risk, easily intrepretable test for lower extremity venous occlusive disease, comments on Doppler ultrasonography as a simple bedside test with a number of false-negative results, and presents radionuclide venography as the middle ground between the less specific noninvasive tests of radioiodinated fibrinogen uptake and Doppler ultrasound and the more accurate but invasive technique of contrast venography. This is a fine review of the problem and the value of radionuclide venography. We would like to call attention to another noninvasive, promising diagnostic modality, namely, the use of thermography.

Cooke has emphasized (*2*) that one of the most constant clinical signs in deep venous thrombosis, present when other signs were either absent or equivocal, was an increase in the heat of the limb and delayed cooling on exposure. Consideration of the chemical activity in the limb accompanying and caused by a thrombotic episode did suggest the possibility that increased heat could be present, although subclinically, from an early stage. Thus, a means of measuring this increased heat would possibly present a method by which deep venous thrombosis could be detected early in its development. Thermography offers such a technique. It also has the advantage of being truly noninvasive. Thermography shows the temperature difference on an object in the form of a thermal picture (gray-tone thermogram) using the natural infrared radiation that varies with the surface temperature of the object. In our study we used the AGA thermovision system 680 which operates in a fashion similar to that of a closed circuit television in which a camera is coupled to a display unit. The camera unit consists of a single indium antimonide detector cooled with liquid nitrogen to attain a high sensitivity in the spectral band of 2–5.6 microns. Encouraged by Cooke's report, we have applied the study to 17 patients with suspected pulmonary emboli. In 15 such patients, all of whom had abnormal perfusion scans and clinical course entirely compatible with the diagnosis of pulmonary embolism, thermography demonstrated unilateral heating of one thigh or leg. Two patients clinically suspected of having pulmonary embolism had normal lung scans and the clinical followup suggested that they had a different explanation for the onset of chest pain. In both patients thermography of the legs was normal. In one of these two patients there was clinical suspicion of deep vein thrombosis and a phlebogram was obtained. This demonstrated varices but no thrombosis.

Five of the 15 patients who had positive thermography and abnormal lung scans also had x-ray contrast venography that did demonstrate unilateral thrombosis in the leg or thigh veins. The thermographic examination is conducted in a room with temperature maintained around 76°F and where all sources of draft are excluded, such as open windows and doors. The patient is exposed to the pubis for 10 min before thermographic examination; the ankles are placed 4–6 in. apart and externally rotated. This procedure allows the legs to obtain thermal equilibrium with the surrounding atmosphere. The ankles are elevated slightly so that the calves are not compressed by touching the mattress, allowing an unobstructed venous return. Time taken to examine one patient is about 10 min for cooling and about 5 min to expose the different pictures.

A personal communication from Dr. Cooke (*3*) states that he has recently studied 100 postoperative and general medical cases with correlations between thermography and phlebography. There were only three discrepancies in the sense that there were two false negatives by thermography and one apparent false positive.

In our limited experience, this modality represents a major advance in the diagnosis of patients with venous thrombosis and pulmonary embolism.

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