Initial chromatographic analysis after preparation of the colloid showed good labeling, but subsequent patient studies showed excessive blood-pool activity and occasional evidence of free pertechnetate later in the day.

After several fruitless searches, the problem was eventually traced to the antiseptic that we used to sterilize the tops of our vials. The other hospitals used 70% alcohol, whereas we used a preparation of iodine complexed with polyvinyl pyrolidone*. Other similar products are Betadine† and Bridine‡. The antiseptic action of povidone-iodine solutions is due to the available iodine present in the complex, which yields nascent oxygen in aqueous solutions.

After the usual preparation of the sulphur colloid, we normally had 0–3% free technetium, but in the presence of Proviodine this increased to between 10–100% free.

We found that only a small amount of Proviodine need enter the vial to inhibit labeling or release previously bound technetium. When the vial is swabbed, a small puddle often remains on the septum so that some Proviodine enters with the needle. If the Proviodine is allowed to dry completely on the septum, no problem occurs, since then it is not sucked into the evacuated vial.

Many antiseptics, particularly iodinated ones, are good oxidizing agents. These may oxidize the compound, releasing technetium and degrading the radiopharmaceutical. It is important that precautions be taken so that no antiseptic contaminates the radiopharmaceutical.

We think that this is an important consideration if any institution has a problem with poor labeling or instability of radiopharmaceutical kits.

We now sterilize the tops of vials with alcohol, and have had no problems with radiopharmaceutical instability.

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FOOTNOTES

* Proviodine, Rougier Inc., Montreal, Canada.

† The Purdue Frederick Co. Ltd. (Canada), Toronto, Canada.

‡ Allen & Hanburys, Toronto, Canada.

Pulmonary Radioactive Microemboli following Radionuclide Venography

Radionuclide venography is a study frequently used to diagnose deep venous thrombosis in the lower extremities. This technique has generally been considered free from complications. We report a problem with this procedure that is apparently rare.

A 48-year-old male, who had received a gunshot wound to his left thigh approximately 30 yr previously, was seen for varicosities and stasis ulceration of that leg. Contrast venography using 250 cc. of 25% diatrizoate sodium was technically unsatisfactory. One hour later a radionuclide venogram of the left lower extremity was performed using 3 mCi Tc-99m MAA.

Radioactivity was seen only in the superficial veins of this limb (Fig. 1A). Tagging of clot in the calf veins was noted at the end of the procedure (Fig. 1B). In view of the apparent deep venous thrombosis, an eight-view pulmonary perfusion series was performed, but it revealed no perfusion defects.

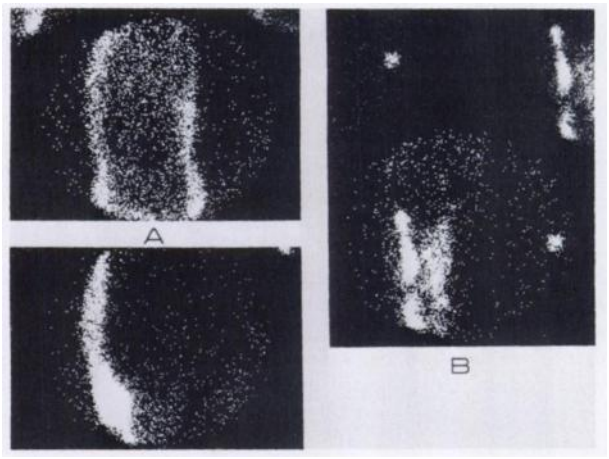

FIG. 1. Radionuclide venogram of the left lower extremity. Activity is seen to be limited to superficial veins of this extremity in both thigh and calf (A). Later imaging of calf shows tagging of clot in expected position of deep venous system (B).

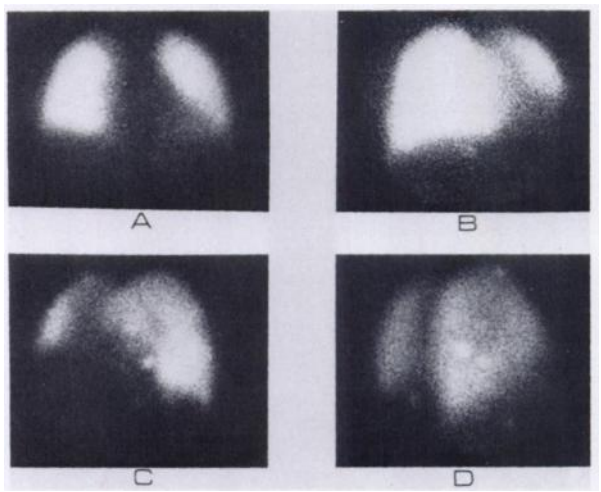

FIG. 2. Immediate pulmonary perfusion scintigrams, those shown being the first, third, fifth, and eighth. (A) = ant., (B) = RAO, (C) = LAO, and (D) = RPO. Series shows increasing radioactive emboli. Note peripheral arrangement, suggesting subpleural locations.

After the normal anterior scintigram (which was done first), however, "hot spots" were seen to appear on subsequent scintigrams, increasing in number between the earliest and later images (Fig. 2). These emboli were subpleural, suggesting that they were quite small. The patient had no complaints during or after the study. His post-scan chest roentgenogram was normal, and he remained asymptomatic.

There has been one other report in the literature of intercurrent radioactive embolization. This occurred during lung scanning during upper-extremity venous disease (*1*). In neither this case nor our own was this phenomenon felt to be the result of improper technique during injection of the radionuclide. The same procedure and material have been used in over 100 other radionuclide venograms, and subsequent perfusion images have not produced these findings.

Experience with the "hot clot" phenomenon resulting from the mixing of MAA with blood drawn into the syringe has been reported (*2*). Preston and Greenlaw (*3*) offer,

as an alternative explanation for "hot emboli," the possible association with hypercoagulability of blood, as seen in critically ill cancer patients and in postoperative patients.

In the present case, the latter two explanations are not applicable; rather, the radioactive microemboli appear to have arisen from tagged deep venous thromboses following low-pressure, low-volume injections soon after a contrast venogram had been performed. It appears, therefore, that radioactive microembolization arising from a tagged thrombus may occur as a complication of radionuclide venography in a patient with an abnormal peripheral venous system.

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Diethyl-IDA: A Promising Hepatobiliary Radiopharmaceutical

The recent editorial on hepatobiliary radiopharmaceuticals has come to our attention (*1*). Indeed, diethyl-IDA, used for several months for hepatobiliary studies in our department, appears to be the best tracer available, especially in disorders of the gallbladder. With diethyl-IDA, neither false negative nor false positive results were ever observed, while this was certainly not the case with 99m-Tc-PyG or 99m-Tc-DHTA.

We recently reviewed a series of 30 patients investigated with diethyl-IDA, comprising 20 normal subjects and 10 patients suffering from various gallbladder disorders (8 cholecystitis and 2 cholelithiasis). Eight of 20 normals were not fasting at the moment of the investigation. In 18 cases out of the 20 normal subjects, the gallbladder was visualized from 9 to 34 min after injection of the tracer. In two other normals, the gallbladder was not seen, but none of these was fasting. Failure to visualize the gallbladder was systematically observed in all the pathologic cases, even when late views were obtained.

Thus, provided that the investigation was performed in the fasting state, a normal gallbladder was always visualized; but any acute or subacute disorder of the gallbladder was characterized by the absence of visualization of the gallbladder.

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Pericardial Accumulation of Tc-99m Methylene Diphosphonate in a Case of Pericarditis

Technetium-99m phosphate tracers are currently being employed for the detection of acute myocardial infarcts (*1–3*). While imaging for myocardial infarct, we observed an unusual case of accumulation of Tc-99m methylene diphosphonate (MDP) in the pericardium of a patient with pericarditis and a small pericardial effusion following acute myocardial infarction.

A 32-year-old white male was admitted to the hospital with acute onset of crushing retrosternal chest pain accompanied by nausea and diaphoresis. An electrocardiogram revealed typical changes of an acute infero-lateral wall infarction. This was further confirmed by the characteristic rise in cardiac enzymes, with a peak CPK of 350 (normal, less than 12), peak SGOT of 561 (normal, less than 40), and a peak LDH of 1230 (normal, less than 250). Serial electrocardiograms revealed typical evolution of an infero-lateral infarction with development of Q waves in I, II, III, AVL, AVF, V5, and V6.

Twenty-four hours after admission the patient complained of precordial pain suggestive of pericarditis—worse on inspiration and on lying on the left side, and relieved slightly by leaning forward. A triphasic friction rub was audible at this time. Chest x-ray showed mild venous congestion and interstitial edema. Heart size was normal. On the third day of infarction, myocardial scintigraphy was performed using 15 mCi Tc-99m MDP, accumulating 500,000 counts per image. The images demonstrated uptake compatible with an infero-lateral myocardial infarction, but there was also unusual accumulation of the tracer in the pericardial silhouette (Fig. 1). An echocardiogram done immediately following the scan revealed a small (5-mm) pericardial effusion. Coronary arteriography revealed single-vessel disease involving the left circumflex artery at the origin of the first marginal branch. An 80% stenosis was estimated, with good distal runoff. Left ventriculography revealed marked hypokinesis of the anterior, inferior and apical surfaces. Hemodynamic values were normal. BUN, creatinine, serum calcium and phosphorus were normal. Repeat chest x-ray did not show any calcification within the pericardial silhouette.

The mechanism of the phenomenon of soft-tissue uptake is not well understood. Both benign and malignant soft-tissue lesions may concentrate phosphate tracers (*4*). Recently, intense myocardial uptake of Tc-99m diphosphonate has been reported in a uremic patient with secondary hyperparathyroidism and pericarditis (*5*). Concentration of these tracers in inflammatory conditions (*6,7*) and pleural effusions (*8*) have also been described. Accumulation of Tc-99m MDP in our case is a very rare condition. Since the pericardial effusion in our patient was quite small, it is likely that the increased uptake was due to the inflammatory component of the pericarditis rather than to the effusion, although direct proof of this is lacking.

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