Pulmonary Radiation Microemboli

It was with great interest that we read this journal's recent article on "Pulmonary Radioactive Microemboli following Radionuclide Venography" (*1*).

Since 1974 our department has used a method of venography slightly modified from Henkin et al. (*2*), using MAA from various manufacturers. Shortly after this procedure was adopted, some of our patients developed small, pulmonary emboli with concentrated radioactivity (Fig. 1). In some of the injected veins, a persistent streak could be seen to extend from the injection site up through the lower third of the calf. We concluded that the sluggish blood flow diluted the injectate too slowly, with resulting i.v. clotting. We believe that the observed pulmonary microemboli could originate from such radioactive clots in the legs. We also think that spots of increased radioactivity in the veins of the lower extremities could result from entanglement of radioactive microemboli in pre-existing thrombi.

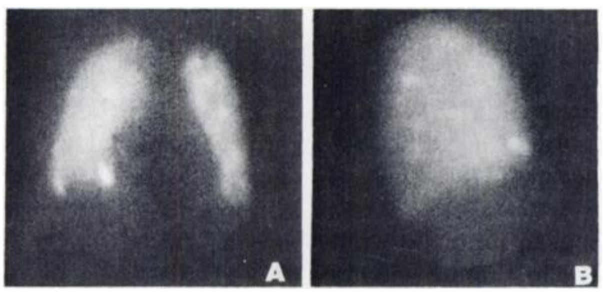

FIG. 1. "Radioactive" pulmonary microemboli in peripheral lung vessels as a result of i.v. blood coagulation caused by slow dilution of Tc-99m MAA. (A) anterior view and (B) right lateral view.

By way of prevention, 2 yr ago we started to mix 2,000 units of heparin into each prepared suspension of Tc-99m before injection. Since that time we have seen neither local thrombosis nor "radioactive" pulmonary emboli. There may be modest uptake in the thrombosed legs, but at most it is transitory, lasting 1 min or less.

BUDIHNA NATASA
FONDA UGO
BATAGELJ IGOR
Tozd Klinika za Nuklearno Medicino
Ljubljana, Zaloska, Yugoslavia

REFERENCES

1. Conca DM, Brill DR, Shoop JD: Pulmonary radioactive microemboli following radionuclide venography. *J Nucl Med* 18: 1140–1141, 1977

2. Henkin RE, Yao JST, Quinn JL, et al: Radionuclide venography (RNV) in lower extremity venous disease. *J Nucl Med* 15: 171–175, 1974

Human Reaction to Bovine TSH

The readership is in debt to Dr. Krishnamurthy for his recent article showing the relationship between dosage and human reaction to Bovine TSH (*1*). This report lends support for the attitude of those of us who advise allowing the patients to produce their own endogenous TSH by permitting them to be off thyroid hormone 6 wk before imaging procedures are employed. This will generally permit endogenous serum TSH levels to reach a maximum. Under these circumstances, supplemental exogenous TSH adds nothing. If this period of withdrawal from thyroid hormone does not result in high levels of endogenous TSH, one could conclude that there is a substantial amount of functioning thyroid tissue remaining. Under these circumstances, the radioactive iodine uptake will be adequate for therapeutic purposes without stimulation in most instances. In some cases one can employ a period of treatment with antithyroid drugs, taking advantage of the rebound increase in radioiodine uptake after their withdrawal, or the diuretic regimen I reported several years ago (*2*).

Utilizing these techniques will make it seldom necessary to employ exogenous TSH in the treatment of thyroid cancer patients.

JOEL I. HAMBURGER
Associated Endocrinologists—Northland Thyroid Laboratory
Southfield, Michigan

REFERENCES

1. Krishnamurthy GT: Human reaction to Bovine TSH: Concise communication. *J Nucl Med* 19: 284–286, 1978

2. Hamburger JI: Diuretic augmentation of 131-I uptake in inoperable thyroid cancer. *New Engl J Med* 280: 1091–1094, 1969

Coincidence Assay Techniques—Hg-197

We have read with interest the correspondence on the coincidence summing technique applied to the absolute calibration of I-125 (*1,2*). It seems useful to draw attention to limitations in the validity of the present techniques, but it is also necessary to demonstrate the significance of the correction terms under the conditions of practical measurement typically employed.

We have recently applied the coincidence-summing assay technique to Hg-197 (*3*). This nuclide shows a decay scheme closely analogous to that of I-125 (Fig. 1), since the 192-keV and 268-keV gamma photons have an intensity <2% of that of the 77-keV gamma (*4*). The K x-rays range in energy from 67 keV to 81 keV, and thus as with I-125 the gamma photon and the K x-rays will be detected with almost equal efficiency by a NaI(Tl) well crystal.

Figure 2 shows spectra for a sample of Hg-197 of ~2 kBq (2,000 d/sec) counted outside and inside the well of a NaI(Tl) crystal. The upper spectrum shows one peak from the gamma and the K x-rays, whereas the coincidence spectrum (lower) shows a second peak at the sum of the x-ray and gamma energies.

Eldridge and Crowther (*5*) developed the earlier work of Harper et al. (*6*) to show that the activity N of a sample of I-125 is related to the counts per second in the singles and coincidence peaks, A_s and A_c, by the equation

$$N = \frac{P_1P_2}{(P_1 + P_2)^2} \cdot \frac{(A_s + 2A_c)^2}{A_c} \text{ Bq.},$$

where P_1 and P_2 are the emission probabilities for the gamma and x-ray photons, respectively. This is effectively the same equation as quoted by Harper and Lathrop (*2*). With their intensity data for I-125, the coefficient takes the value 0.240 and is insensitive to small changes in P_1 and P_2.

We have applied this equation to Hg-197 using the decay data given in the M.I.R.D. tables (*4*), which give the intensity of the 77-keV gamma photon to be 0.253 and the total intensity of the K x-rays to be 0.717. These give a