

Radiation Injury After Interstitial Injection of Iodocholesterol

TO THE EDITOR: In the May 1991 issue of *JNM*, Breen and Driedger reported on a radiation injury following the interstitial injection of [131 I]iodocholesterol (1). The topic of inadvertent extravascular injections of radiopharmaceuticals was further elaborated by Hoop in an editorial (2) in the same issue. It was a timely reminder because nuclear medicine is so dominated by ^{99m}Tc with its short half-life and gamma emissions that it is easy to forget the possibility of radiation injury. This forgetfulness is further aided by the fact that most other radionuclides are given in much smaller doses than ^{99m}Tc .

In June 1991, shortly after the May issue of *JNM* had arrived, a thallium stress test was performed on a 60-yr-old female patient. The re-injection dose of approximately 1 mCi of thallium was given extravascularly. With the information of the *JNM* article still fresh in mind, the following preventative measures were taken: one ampule (1500 U) of Hyaluronidase was diluted according to the manufacturer's instructions and injected subcutaneously near the site of the thallium injection. When the patient was examined the next day (19 hr later), there was no evidence of the faulty injection from the previous day.

This incident is reported because I am not aware of the use of Hyaluronidase other than hypodermoclysis or local anesthesia. Articles on the topic of interstitial injections usually describe the incident and expand on dosimetric calculations, but do not proffer "therapeutic" suggestions. Our single experience does not prove the efficacy of Hyaluronidase and a study to verify the benefits of Hyaluronidase in extravascular injections of radiopharmaceuticals can only be done in animal experiments. If, however, other nuclear medicine departments decided to use Hyaluronidase and report their experience in this journal, it should not be long before its usefulness is determined.

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2. Hoop B. The infiltrated radiopharmaceutical injection: risk considerations [Editorial]. *J Nucl Med* 1991;32:890.

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REPLY: The incident related by De Zwart concerning the redistribution of an extravascular injection of ^{201}Tl following local administration of Hyaluronidase is probably not comparable to the situation that we described concerning the extravasation of [131 I]iodocholesterol.

Unlike iodocholesterol, thallium is a water soluble ion. By way of comparison to intentional interstitial injections, one would anticipate complete absorption of thallium from the injection site in a relatively short time. In this uncontrolled situation, it is not possible to say what the effect of the Hyaluronidase was. The

likelihood that a local radiation injury could occur from an interstitial injection of thallium- or a technetium-based radiopharmaceutical is remote. Therefore, we would urge caution to nuclear physicians lest we overtreat these situations. Hyaluronidase is a foreign protein and allergic reactions are known to occur in response to its administration. Since iodocholesterol is not water soluble, we would not anticipate that an extravascular concentration would be mobilized by Hyaluronidase.

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Scanning the Thyroid with Technetium-99m-Pertechnetate

TO THE EDITOR: In two previous papers published in *The Journal of Nuclear Medicine*, it was reported that ^{201}Tl and ^{99m}Tc -TBI could be successfully used to visualize suppressed thyroid tissue as an alternative to post-TSH stimulation scanning (1,2). Thyroid perfusion scanning with [^{99m}Tc]pertechnetate is being used in our department for this purpose. In the patients we have studied so far, we have demonstrated extranodular suppressed tissue with [^{99m}Tc]pertechnetate perfusion scanning (Figs. 1 and 2).

Although in the studies reported in the *Journal* that suppressed thyroid tissue had been visualized, depending upon the uptake mechanism, [^{99m}Tc]pertechnetate perfusion scanning demonstrates the suppressed tissue due to its vascularization. If the purpose is to demonstrate suppressed tissue irrespective of its function, thyroid perfusion scanning can be used successfully.

Thyroid perfusion scanning with [^{99m}Tc]pertechnetate is an inexpensive, fast and easily performed technique for the visualization of suppressed thyroid tissue. In routine clinical practice, for patients with palpable nodules and suspected hyperthyroidism, radiation exposure will be decreased using two phases: (1) the perfusion phase at the first minute and (2) the functional phase at the 20th minute by scanning the thyroid with [^{99m}Tc]pertechnetate.

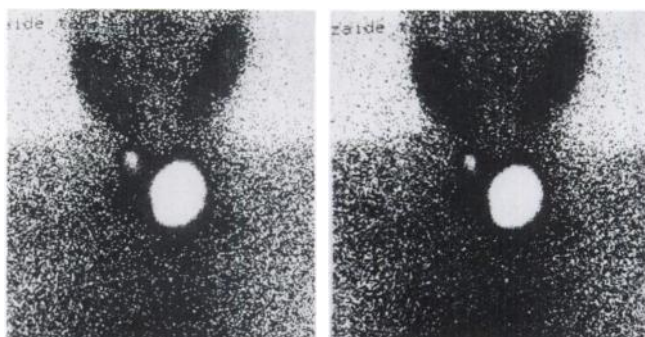


FIGURE 1. Image obtained at 20th minute. Left lobe of the thyroid is visualized, but the right one is not because of suppression.

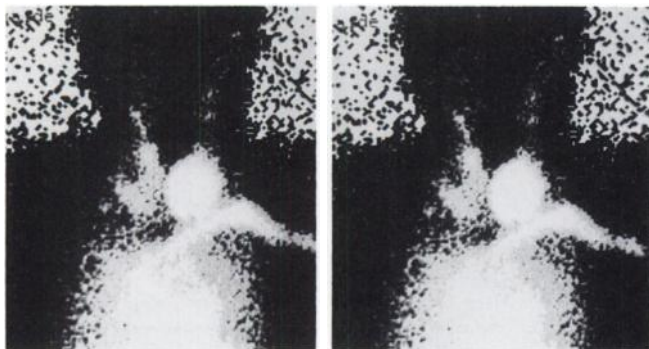


FIGURE 2. Perfusion image of the same patient. Note that the suppressed right lobe of the thyroid is now visualized.

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2. Ramanathan P, Patel RB, Subrahmanyam N, et al. Visualization of suppressed thyroid tissue by Tc-99m-tertiary butyl isonitrile: an alternative to post-TSH stimulation scanning. *J Nucl Med* 1990;31:1363-1365.

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Thallium Stress Test for ECG Response and Perfusion Images

TO THE EDITOR: The CPC entitled "A Thallium Scan Goes to Court" appearing in the January issue was very well done and informative. Although I am sure all of us agree with the court's decision in favor of the defendants, it is somewhat disheartening that there were colleagues willing to be so resolute in their testimony with regard to the thallium stress test for both the ECG response and perfusion images.

Certainly the case presents a number of interesting questions. These include whether the test was indeed a false-negative, unusual for a middle-aged man, even from the standpoint of the ECG response, or whether in fact the underlying LAD stenosis was not flow-limiting (flow-limiting or decreased coronary blood flow reserve does not automatically indicate the presence of myocardial ischemia) at the time of the study. Certainly we are well aware that local-endothelial and rheologic factors play a very important role during "active" phases, especially periods of unstable angina pectoris. Although a number of reports have indicated that it is difficult to identify a culprit lesion and up to 66% of acute infarctions may be associated with stenosis of less than 50% (1,2), this is most likely not the general community experience. Our experience is less than 30% (3000 diagnostic catheterizations and >600 interventions per year). In this particular case, cause and effect along with the timing of the events can be debated. However, to go back to the beginning, this was a 41-yr-old male with a very bothersome clinical presentation with multiple coronary artery disease risk factors present, in addition to a baseline abnormal ECG. Even though the patient was stabilized by medical therapy, considering his age and presentation, invasive

evaluation with coronary arteriography should have been performed. If the patient's clinical presentation was more atypical, if he had no or minimal coronary artery disease risk factors, and a perfectly normal ECG, then perhaps initial noninvasive evaluation would have been appropriate. Although the physician's approach was acceptable and no negligence occurred with regard to the performance and interpretation of the patient's thallium stress test, the initial approach to this patient's diagnosis and therapeutic considerations should be considered inadequate.

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Quantitative Dynamic Parameters to Evaluate Impotence

TO THE EDITOR: In light of our own interest in impotence studies (1), we were most pleased to see the recent attention focused on this topic in the January issue of *The Journal of Nuclear Medicine* (2-4). The ability to quantitate dynamic parameters by scintimetric means contributes uniquely to the evaluation of impotence and has increased in relevance with the availability of intracavernosal injection therapy.

In the historical development of both penile blood pool and xenon-washout studies, the original researchers utilized nonimaging probes to measure penile radioactivity (5-7). Subsequent workers substituted imaging on the Anger gamma camera with background subtraction and operator-defined regions of interest; however, no study has indicated that spatial information is of any particular value, other than in defining the penile region (1). With this understanding, absence of penile images in the recent publications comes as no surprise (2,3). In our own impotence

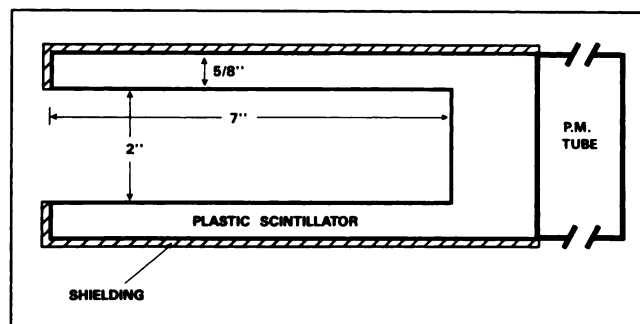


FIGURE 1. Cross-sectional schematic of the circumferential penile probe graphically demonstrates the near-optimal geometric efficiency and lack of collimation possible with this dedicated, portable unit.