Post-Surgical Follow-up of Differentiated Thyroid Carcinoma

TO THE EDITOR: We were very interested to read the article (1) by Ronga and colleagues which depicted nicely the importance of combination of serum Tg levels and whole-body scans, but no mention was made about 18F-fluorodeoxyglucose (FDG) scan of metastases of thyroid cancer, which is done in presence of thyroxine therapy (2,3) and therefore avoids the risks of hypothyroidism.

REFERENCES


M. A. Taher
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REPLY The observation made by Dr. Taher is very important and indeed 18F-FDG scintigraphy could be widely and successfully used for the follow-up of metastasis from differentiated thyroid carcinoma (DTC) in the near future. Two aspects are limiting its use at the moment: (a) more clinical studies are needed to confirm its clinical usefulness towards conventional thyroglobulin (Tg) measurement and 131I whole-body scan (WBS); (b) its use is limited only to those centers who have access to a cyclotron. In many nuclear medicine centers, as in Rome, a cyclotron is not available and follow-up of patients with DTC depends on conventional Tg measurement and 131I WBS. Thus, our study has high clinical relevance. Moreover, the aim of our study was not to compare the 131I WBS with other imaging techniques, but to compare Tg and WBS sensitivity and specificity.

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Ablation Dose of Iodine-131 for Postoperative Remnant

TO THE EDITOR: I have read the article by Johansen et al. (1) with much interest. They prospectively compared the efficacy of 1073 MBq and 3700 MBq doses given every 3-4 mo for ablation of postoperative residual thyroid tissue. They concluded that there was no difference in the number of doses needed to achieve "scintigraphic ablation" between the two levels of therapy doses. I would like to have the authors clarify their data and ask their thoughts on a few points. The total number of subjects was said to be 63, but the numbers on Table 2 do not add up to it. This table is very confusing. Looking at Group I first, there were 36 patients, but only 26 received a “first” dose (21 of this 26 were ablated). What happened to the remaining 10 patients? Did they receive second and third doses without a first? The arithmetics were confusing for Group II as well. It was not clear whether the patients who had “scintigraphic ablation” at 3 mo had further follow-up studies.

It was a prospective study, and the authors must have known the importance of serum TSH levels in the uptake of radioiodine. There was, however, no mention about the actual serum TSH levels in their subjects. Many patients (39% and 46%) received TSH injections without discontinuing thyroxine treatment. This approach is shown to be less effective in preparing for radioablation (2).

The authors waited only 3-4 mo to determine whether the 131I treatment was effective, and gave second, third, fourth and fifth therapy doses, a rather aggressive approach. Three months is certainly too short a period to determine the effect of a therapy dose. Waiting 6 mo to a year conventionally before giving subsequent doses might have changed the results. It has been shown that the functional capacities of recently irradiated thyroids by as little as 185 MBq are far less than their pretreatment levels (3). It is not too difficult to assume that the effect would be greater when a much larger amount (1073-3700 MBq) of 131I is given. If this simple radiobiologic fact is accepted, then, one can easily see that a lesser and lesser amount of the subsequent 131I doses will end up in thyroid, and that most of the therapy doses “go down the drain.” Some are expressing concerns even over the scanning doses of I-131, fearing that it may stun the cells and possibly prevent maximum uptake of a subsequent therapy dose (3-5).

Just how long a thyroid would remain stunned after varying doses of sublethal doses of 131I is not well known at present time.

It is a well-accepted radiobiologic assumption that a successful 131I thyroablation will depend on:

1. The total absorbed radiation dose which, in turn, depends on the amount administered, functional status of the thyroid, size of the lesion, and the biologic half-life of 131I in the thyroid tissue.
2. The radiosensitivity of the individual thyroids and thyroid cancers, which is, unfortunately, not measurable. In their study as presented, there were no attempts made for dosimetric calculations, such as measuring thyroid uptake and estimating the size of the “lesions.” Also, without follow-up information given, their data do not have much meaning, and I believe their conclusion becomes a misleading one.

REFERENCES

TO THE EDITOR:
It is not unusual to find a nuclear medicine department located on the ground floor or basement of a major hospital. Departments located on the ground floor, however, are susceptible to unique environmental problems because of their setting, including pollution of the air by unvented gases. We recently experienced a disastrous leakage of toxic gas from an unexpected source located in a clinical imaging room. One morning, technologists working in an imaging room detected an unpleasant odor which they attributed to sewage. Gradually, the odor intensified and spread to the adjacent room. Two individuals working in that room became sick: one developed nausea and vomiting, the other developed a severe headache. Environmental safety officers monitoring the area with a portable ambient air analyzer, a single-beam infrared spectrophotometer, MIRAN 1B (The Foxboro Co., So. Norwalk, CT), discovered a mixture of hydrogen sulfide (H2S) and sulfur dioxide (SO2). The concentration of the sulfur dioxide reached a high of 4.9 ppm. Five parts per million is considered a toxic level (1). The area was closed to personnel. Six hours after the initial discovery engineers identified the source of the leak—four 12-volt batteries in a mobile gamma camera (Technicare, Model 420). The battery charger had malfunctioned and all four batteries in the camera were damaged.

It took the environmental engineers several hours to locate the source of the leak because we had assured them that the gamma cameras did not contain any material capable of producing hydrogen sulfide. Twelve-volt automobile batteries are used for the mobile gamma camera. The battery chambers are filled with a mixture containing 28% sulfuric acid. If acid leaks from the batteries, a chemical reaction with the material it comes into contact with may produce a variety of gasses, such as SO2, H2SO4, or H2S. Generally, the use of hazardous chemicals in the hospital comes under the control of the Occupational Safety and Health Administration (OSHA). OSHA, it should be noted, does not list these batteries as a potential source of hazardous chemicals or gas.

REFERENCE

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A Source of Toxic Gas Leakage in a Nuclear Medicine Department

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