

Scintigraphic Assessment of Thyroid Cancer

TO THE EDITOR: The assessment of thyroid cancer by imaging is an important clinical need. Use of ^{201}Tl in this assessment was well explored by the authors (1) in a limited group of patients. They were well studied, and the authors were conservative in their enthusiasm for the use of ^{201}Tl in imaging thyroid tumors. On reanalysis of their data, several features emerged that would suggest that they should be even less enthusiastic.

Concerning individual patient data, they listed patients 1, 10, and 16 who were better detected by ^{201}Tl than with ^{131}I . However, Patient 1 (Table 1) actually had neck uptake with ^{131}I which was not visualized by ^{201}Tl , and had no comparable ^{131}I scan with the second study. The second patient, Patient 10, had better visualization with ^{201}Tl , but the neck uptake with ^{131}I was considerable, a common finding in which poor metastatic disease uptake is seen in the presence of residual normal "competing" tissue. The ^{131}I scan and CT findings clearly indicated the need for ablative ^{131}I therapy, and ^{201}Tl added nothing. I would assume ^{131}I therapy was given, but no follow-up scans were presented, if so. Patient 16 (Figs. 1 and 2) clearly had much superior scans and information using ^{131}I than with ^{201}Tl , contrary to the authors' conclusion. The mediastinal uptake so spectacular with ^{131}I is barely evident with ^{201}Tl . Much better and more extensive uptake is also seen in Patient 8 (Fig. 7) using ^{131}I .

Retabulating studies where data are available (absent data not included) from Table 1, very poor results are obtained on comparing ^{201}Tl with ^{131}I studies in all patients. Using ^{131}I as the standard, there were 12 patients (16 studies) with concordance (seven positive, five negative), six whose ^{201}Tl studies were falsely negative, a false-positive ^{201}Tl scan in a stitch abscess, and no false-negative ^{131}I scans.

The result of comparing thyroglobulin (TG) levels to ^{131}I scans is also quite poor. There were 13 patients with concordant results (16 studies), seven patients with false-negative TG results (assuming the authors consider <5 normal) and only one false-negative ^{131}I study (Case 12, not further described). Similar poor correlations were obtained with TG versus ^{201}Tl . The authors referenced a study by Aiello et al. (2), suggesting that ^{201}Tl may help in patients on thyroid replacement coming from long distances or with negative ^{131}I scans. That experience, however, indicated poor sensitivity of TG measurements, high antibody incidence, and poor correlation of titers with amount of disease. In the present series, only one patient (Patient 12) had a normal ^{131}I scan in the presence of an elevated TG level. That patient also had a negative ^{201}Tl scan. The authors' suggestion for use of ^{201}Tl would not appear supported by either theirs or referenced data.

Thallium-201 scans may have a place in the diagnostic evaluation of thyroid cancer patients, but from this study, that place must be very limited. Some of the major attributes of ^{131}I studies are to assess need for postoperative treatment, and determine potential effectiveness based on tumor concentration. The use of another scan agent, even if it were better than ^{201}Tl , may lead to unneeded delays, misinformation, and expense. The false negative results with ^{201}Tl compared to ^{131}I are very disturbing if one were attempting to use this agent for following and screening patients for persistent or progressive disease. Its use would be confusing at best, and other than allowing an imaging procedure to be performed while on thyroid replacement, would appear to have little advantage.

Using endogenously stimulated TSH with triiodothyronine (4 wk) and no replacement for 2 wk is a very easy procedure

preceding ^{131}I imaging that allows minimal hypothyroid symptoms, maximal information for treatment planning, and the patient is ready for therapy immediately. Thallium-201 cannot offer this.

The authors are to be congratulated in performing this study, which to me, even further documents the lack of need for ^{201}Tl use in thyroid cancer. It is somewhat surprising that thyroglobulin determinations fared so poorly in their study, but enthusiasm for its use may need to be lessened as well.

REFERENCES

1. Burman KD, Anderson JH, Wartofsky L, et al. Management of patients with thyroid carcinoma: application of thallium-201 scintigraphy and magnetic resonance imaging. *J Nucl Med* 1990;31:1958-1964.
2. Aiello DP, Manni, A. Thyroglobulin measurement vs iodine-131 total-body scan for follow-up of well-differentiated thyroid cancer. *Arch Intern Med* 1990;150:437-439.

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REPLY: We would like to thank Dr. Boyd for his thoughtful review of our article and for his constructive comments regarding our patient data (1). Because he did not mention our MRI data, we assume he concurs with our comments regarding its potential utility in helping to localize thyroid cancer deposits. We agree with many of the comments and conclusions in his letter, but tend to have a different opinion regarding the application of these data in a clinical setting. We also disagree with Dr. Boyd's interpretation of Figure 1, Patient 16. Our viewing of these scans suggest thallium was able to detect extensive disease in the neck that radioiodine could not clearly discern, especially in the 1989 studies following radioiodine therapy. Disease was present in the chest and mediastinum using both scanning procedures. We believe that there are patients (Figure 5, Patient 10) in whom thallium scanning is capable of detecting the extent of metastatic thyroid cancer better than routine iodine scanning. Efforts to dismiss these findings as being related to "the presence of residual 'competing' tissue" only underscore the utility of thallium in these circumstances. Patient 8 in Figure 7 apparently shows widely metastatic disease with both techniques. Patient 1 (Table 1) had disease recognized by thallium scan that was not present by iodine scanning only 2 mo earlier. As a result of our interpretation of the scans in the patients noted above, we reiterate our conclusion that "thallium scanning can be an effective means to detect residual thyroid tissue or metastatic disease." Our article agrees, in general, with references 7, 8, 11, and 16 (cited in our original article), which also observe that thallium scanning may be useful in detecting thyroid cancer in selected patients.

But, perhaps, the most important argument supporting the utility of thallium scans relates to the ability to perform scans even when a patient continues to take L-thyroxine therapy and, therefore, remains clinically and biochemically euthyroid. Contrary to the admonition by Dr. Boyd that preparation for a radioiodine scan "is a very easy procedure . . . that allows minimal hypothyroid symptoms," both our staff and patients believe that the process of stopping L-thyroxine, switching to triiodothyronine, and then being hypothyroid for several weeks is a complicated, uncomfortable procedure, which if given a choice, they would avoid. Patients universally manifest clinical and biochemical hypothyroidism with serum T4 levels less than 1 $\mu\text{g}/\text{dl}$ and