Whole-Body Thyroid Tumor ^{123}I Scintigraphy

TO THE EDITOR: We appreciate the favorable report of Shankar et al. on the use of 24-h ^{123}I scintigraphy for whole-body thyroid tumor imaging (*1*). We concurrently reported our study on the use of ^{123}I thyroid tumor imaging (*2*), in which we compared whole-body acquisitions 6, 24, and 48 h after ^{123}I doses of 111–185 MBq (3–5 mCi). We agree with the investigators that, versus the 6-h imaging time, the 24-h imaging time improves detection of less avid sites of differentiated thyroid tissue. However, we disagree with the authors' assertion that even larger ^{123}I doses and a later imaging time, that is, 48 h, do not further improve sensitivity. Our experience showed that, in conjunction with our higher-dosage scheme, 48-h images yielded a higher target-to-background activity at sites of differentiated thyroid tissue, either tumor or remnant, than did images obtained at 24 or 6 h. In 1 patient, shown in our Figure 2, 48-h images alone demonstrated the site of thyroid metastasis, which was subsequently confirmed on the post–^{131}I therapy scan. (The specificity of this finding on the 48-h diagnostic scan was further confirmed by a significant post–^{131}I therapy decrease in the patient's thyroglobulin level.)

The authors cited a study by Berbano et al. (reference 9 in their article) in which no advantage over 24-h ^{123}I imaging was claimed for 48-h ^{123}I imaging (*3*). Unfortunately, target-to-background ratio, known to have affected diagnostic sensitivity in all other diagnostic imaging experience with ^{131}I, was neither qualitatively nor quantitatively evaluated in this study. A single 48-h whole-body image was shown (Fig. 6), with a caption stating that the image shows ". . . less defined areas of uptake in comparison with 24-h image [shown in the adjacent figure]." Both the 24-h and the 48-h images for this patient show only a prominent thyroid remnant, with a better-quality image at the earlier time, as expected because of the higher counts. However, another figure in this article (Fig. 3) shows a patient for whom the post–^{131}I therapy scan showed multiple additional tumor foci, compared with the 24-h ^{123}I diagnostic scan, without reference to the 48-h ^{123}I scan. It is curious that the authors chose, as their sole example of a 48-h ^{123}I scan, one showing only a prominent remnant in the thyroid bed (typically least likely to benefit from late imaging in our experience), as opposed to a 48-h ^{123}I scan from a patient for whom the post–^{131}I therapy scan showed multiple tumor foci that were not seen in companion 24-h ^{123}I images.

Both larger diagnostic doses of ^{131}I and the use of later post–^{131}I therapy imaging times are known to positively affect the sensitivity of diagnostic imaging (*4*,*5*). Therefore, it would stand to reason that these same technical variables would similarly augment the sensitivity of ^{123}I diagnostic scanning, particularly for residual or metastatic thyroid tumor, which is often less radioiodine avid than is thyroid remnant. Our own experience supports this supposition (*2*).

The value of routine diagnostic radioiodine scanning before ^{131}I radioiodine ablative therapy remains controversial. However, we continue to believe in the importance of defining the full extent of thyroid remnant and tumor before ^{131}I therapy, since this diagnostic assessment affects determination of the ^{131}I therapeutic dose. Toward that end, we agree with the authors that diagnostic scanning with ^{123}I, rather than with ^{131}I, affords the advantages of improved image quality and absence of any significant potential for stunning. However, our experience with ^{123}I (*2*) and extrapolation from prior experience with ^{131}I (*4*,*5*) both support the suggestion that using larger doses of ^{123}I and a later, 48-h, imaging time should improve diagnostic sensitivity.

We also note the following technical criticisms. First, the ^{123}I and post–^{131}I therapy diagnostic images in the authors' Figure 3 appear notably suboptimal, with a superimposed phototube artifact of a Swiss-cheese pattern. This artifact is typical of imprecise uniformity correction, which will compromise diagnostic sensitivity, particularly at later imaging times because of the proportionately greater error with lower count rates. Second, we take issue with the investigators' use of medium-energy collimation for post–^{131}I therapy imaging. High-energy collimation is more appropriate for the 364-keV ^{131}I γ-photon. The alternative use of medium-energy collimators will result in greater septal penetration and poorer-resolution images. In a perhaps-related observation, we note that of the multiple pulmonary or hepatic thyroid tumor foci seen in the posterior view of the 24-h ^{123}I whole-body image in the authors' Figure 3, some are poorly visualized or questionably apparent in the companion 7-d post–^{131}I therapy posterior image in the same figure. In particular, these include the superiormost focus in the right lung, which is equivocal in the ^{131}I image, and the medial inferiormost focus also on the right, which is absent in the ^{131}I image. This difference may be at least in part related to suboptimal collimation of the high-energy ^{131}I photon. This limitation could have artifactually decreased the number of tumor foci identified in the post-^{131}I therapy scans, thereby potentially masking some false-negative results on 24-h ^{123}I diagnostic images.

REFERENCES

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