Clinical THYROIDOLOGY



Should 99mTcO4 Thyroid Scintigraphy Still Be Used In Investigating Thyroid Nodules In Multinodular Goiter?

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Graf D, Helmich-Kapp B, Graf S, Veit F, Lehmann N, Mann K. Functional activity of autonomous adenoma in Germany. Dtsch Med Wochenschr 2012;137:2089-92.

Background

The ATA and ETA guidelines on thyroid nodules recommend considering radionuclide scanning in patients with thyroid nodules if the serum TSH is low (<0.4mU/L) or low-normal (e.g., <0.6 to 0.4 mU/L) (1,2). FNAB without prior scintigraphy is recommended for all other nodules ≥ 1 cm diameter examined by ultrasound. In geographic areas that formerly had or still have dietary iodine deficiency, such nodules are frequent and most often embedded within small multinodular goiters (3). It is argued that FNAB can be avoided if such nodules are scintigraphically shown to be autonomously functioning, since malignancy is exceedingly rare in this condition. In Germany, endemic goiter is decreasing in the younger population, but in elderly persons it is still a frequent finding (4,5). It is therefore understandable that in this country thyroid scintigraphy still plays an important role in the evaluation of thyroid nodules.

Methods

In a group of 476 nonselected patients with nodular goiter, nodules >1 cm were investigated by ultrasound and by scintigraphy, even though the serum TSH level was not low or suppressed. For scintigraphy 99mTcO4 was used exclusively, because ¹²³I scintigraphy is too costly for routine use. No technical details are given, but it can be assumed that the standard methods with frontal and lateral pictures was used. FNAB apparently was not done in any cases. The 99mTcO4 scans were classified as compensated (if the extranodular tissue was well visible), partially compensated or decompensated if uptake of the tracer in nonnodular areas was partially or entirely suppressed (sometimes called warm or hot nodules). In five subjects, T_3 suppression tests were performed.

Results

Of 476 patients with nodular goiters, a region of focal autonomy was scintigraphically identified in100 patients. By ultrasound and scintigraphy, 40% were 1.1 to 1.9 cm, 41% were 2 to 2.9 cm, and 15% were \geq 3 cm in longest dimension. In most cases (87), scintigraphy detected only one nodule, while in the remaining 13 cases, two or more focally active areas were present. A total of 68 patients had a serum TSH >0.4 mU/L, while in the remaining 32 patients, the TSH was <0.4 mU/L. There was no strict correlation between serum TSH levels and scintigraphic findings, even though the percentage of decompensated scintigraphy (39%) was similar to those in whom the serum TSH was <0.4 mU/L (32%).

Nodules with a diameter of 1 to 1.9 cm (by ultrasound) were equally distributed among the compensated, partially compensated, and decompensated scans. The larger nodules were more often partially compensated or decompensated. The echographic findings (hypodense structure, microcalcifications, etc.) did not vary with the size of the nodule.

A significantly elevated titer of thyroid anti-TPO antibodies was present in five cases. The results of the five T_3 suppression tests are not reported.

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Conclusions

In a country with prior iodine deficiency, small nodular goiters are a frequent finding. If thyroid scintigraphy is extensively used, as was done in the current study, it will reveal autonomously functioning tissue in about one third of cases). Therefore, thyroid scintigraphy may allow one to avoid FNAB in these circumstances.

ANALYSIS AND COMMENTARY • • • • • •

The recommendations of the ATA and ETA support the use of scintigraphy for nodules present in a multinodular goiter if the patient's serum TSH level is lownormal or suppressed, which was observed in 32% of the autonomous nodules studied here. This percentage would have been even higher if a "low-normal serum TSH" had been defined as higher than the 0.39 mU/L set in this study. Nevertheless, in a considerable percentage of apparently euthyroid patients (TSH >0.4 mU/L), 99mTcO4 scintigraphy indicated a possibly autonomously functioning area. These nodules were selected by their scintigraphic appearance. The authors consider them to be adenomas.

Presumably, thyroids in patients with multinodular goiters whose serum TSH is >0.4 mU/L do not produce excessive amounts of thyroid hormones, but some areas are merely more active than other areas within the goiter. This could correspond to cohorts of follicles that do not correspond to true, clearly circumscribed adenomas. This pathology is obviously very frequent in multinodular goiters and is a completely different entity than adenomas. Since T₃-suppression tests were not done routinely, it is even possible that these areas are not autonomously functioning (3).

Except for anecdotal observations of "functioning" thyroid cancers, "hyperfunction" is generally considered to occur only in benign thyroid lesions. Unfortunately, the authors did not perform FNABs, which is the method of choice for most thyroidologists. We are

therefore missing the critical information of how many operations may have been avoided by preferring scintigraphy over FNAB. It is reasonable to assume that some FNABs would have yielded a cytologic report of indeterminate-type tissue, and some of these patients would have been sent for surgery.

From another viewpoint, one may argue that patients with thyroid autonomy are at-risk for eventual hyperthyroidism. However, the real incidence of this possibility is not known. Excluding transient Jod–Basedow syndrome due to iodine contamination, it certainly would take years, if not decades, for this course of events to occur, and simple surveillance of thyroid function by serum TSH should eliminate the risk of unrecognized hyperthyroidism.

The apparently high incidence of thyroid autonomy in Germany is striking and does not correspond to the rarer observation of thyroid autonomy in iodinereplete areas. It is likely that in Germany many of these observations correspond to autonomously functioning cohorts of follicles of varying size within multinodular goiters (3).

In practice the article reminds us that scintigraphy can still be useful in certain circumstances. However, it should not be considered as a routine procedure in all patients with nodular goiter. A patient with a multinodular goiter who lives or lived in an iodinedeficient area—or a patient who refuses FNAB—may benefit from thyroid scintigraphy, even if she or he has normal TSH values.

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