Clinical THYROIDOLOGY
AMERICAN THYROID ASSOCIATION FOUNDED 1923

CAN NODULES WITH A BENIGN SONOGRAPHIC APPEARANCE BE LEFT ALONE WITHOUT BIOPSY?

Virmani V, Hammond I. **Sonographic patterns of benign thyroid nodules: verification at our institution.** Am J Roentgenol 2011;196:891-5.

SUMMARY

BACKGROUND

There are several published studies that show that a combination of sonographic features such as solid texture, hypoechogenicity, microcalcifications, macrocalcifications, and intranodular vascularity predict that a nodule is more likely to be malignant (1-3). Additional studies have shown that some sonographic patterns are associated with benign nodules. It is unclear whether these benign sonographic characteristics are sufficient to justify the decision not biopsying a nodule >1 cm. Bonavita et al. (4) demonstrated that a nodule with four characteristic morphologic patterns (spongiform, cyst with colloid clot, "giraffe" pattern, and "white knight" pattern) were 100% specific for benignity. This study tests the reliability of the four sonographic patterns to identify benign thyroid nodules.

METHODS

This was a retrospective review of the pathology records and sonograms of 950 thyroid nodules that underwent ultrasound-guided fine-needle aspiration (FNA) biopsy from July 2005 through July 2009. The nodules were placed into four categories based on the cytology: insufficient, benign, indeterminate, and malignant. All the nodules from the benign and malignant groups were included in the study. Nodules with insufficient biopsy samples were excluded from the study. Indeterminate nodules were categorized and included in the study only after post-surgical pathological determinations of whether they were benign or malignant. The ultrasound images of the remaining 811 nodules from 661 patients (552 female, 109 male) with a mean age of 46.5 years (range, 18 to 88) were examined. The nodules ranged in size from 4.8 to 72 mm. The spongiform pattern was defined as an aggregation of multiple linear microcystic components in a nodule giving a honeycomb appearance or "puff pastry" appearance. The cyst with a colloid clot is a cystic nodule with an avascular hyperechoic colloid clot. The giraffe pattern is rounded or ovoid areas of hyperechogenicity separated by thin linear areas of hypoechogenicity that appear similar to the two-tone block-like coloring of a giraffe. The "white knight" pattern is a homogeneous hyperechoic nodule.

RESULTS

A total of 66 nodules showed a spongiform pattern. Of these nodules, 60 were benign on FNA cytology; the remaining 6 had an indeterminate cytology but proved to be benign after surgical resection. A total of 28 nodules showed the cyst with a colloid clot pattern. Of these nodules, 24 were benign on FNA cytology and 4 were benign on postoperative histologic evaluation; 14 showed the giraffe pattern and 13 had a cytologic diagnosis of Hashimoto's thyroiditis. The remaining giraffe-pattern nodule with an indeterminate cytology was removed surgically and found to be Hashimoto's thyroiditis on postoperative histology. White-knight sonographic changes appeared in 8 nodules, and all were shown to be Hashimoto's thyroiditis on cytologic study. None of the 121 malignant nodules showed any of these four benign sonographic patterns.

CONCLUSIONS

These four sonographic characteristics were seen in 116 (16.1%) of the 690 benign nodules but never in the 121 malignant nodules. Therefore, a nodule with one of these sonographic signs is very likely to be benign. But because these signs were seen in only 16% of benign nodules, the absence of them does not indicate an increased risk of malignancy. The 100% specificity of these four sonographic features for benign thyroid nodule may lead to a reduction in unnecessary thyroid biopsies and subsequent surgery for nodules with an indeterminate cytology.

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COMMENTARY

In the past decade, several guidelines (5, 6), including the 2009 ATA Guidelines for Nodules and Cancer, recommend on the basis of strong evidence that an ultrasound should be used to discriminate which nodules have suspicious characteristics and should be prioritized for biopsy. The ATA Guidelines note that a spongiform appearance is likely to be benign, and recommended biopsy only if the nodule >2.5 cm. This study now provides additional evidence that there are sonographic appearances that strongly suggest that a nodule is benign. It is very likely that future iterations of the ATA Guidelines for Nodules and Cancer will suggest that thyroid nodules with certain benign sonographic signs such as spongiform changes may not need to be biopsied at all. A point of concern for me is that these changes can be subtle. Identification of these sonographic characteristics depends on the experience of the person evaluating the images. In addition, high-quality images may not be provided by sonographic equipment used in endocrinology offices.

— Stephanie L. Lee, M.D., Ph.D.

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