AMERICAN THYROID ASSOCIATION
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Clinical Thyroidology® for the Public

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THYROID NODULES

Calcifications on thyroid ultrasound do not necessarily represent thyroid cancer

BACKGROUND

Thyroid nodules are a very common that can be detected in up to 2/3rds of people, often on a physical examination or a test done for other reasons. While most thyroid nodules are not cancer (benign), ~5% are cancerous. Thus, clinicians are often faced with the task of deciding which nodules require further investigation for thyroid cancer with a biopsy, and which nodules can be followed by just observation. In this respect, thyroid ultrasound is the best imaging test to evaluate thyroid nodules, because it can detect features that are felt to predict cancer.

One of the most important ultrasound features of cancer is the presence of calcifications, especially microcalcifications, in a thyroid nodule. Microcalcifications within a nodule are small flecks of calcification 1 mm or less in size that appear bright on an ultrasound image. In contrast, macrocalcifications are more coarse areas of calcification that are greater than 1 mm in size. The presence of microcalcifications (and not macrocalcifications) on an ultrasound is felt to be highly suggestive of thyroid cancer because they are assumed to correlate with the round, calcified *Psammoma* bodies of papillary thyroid cancer that a pathologist sees when examining thyroid tissue under a microscope after surgery. Thus, it is commonly accepted that, when present on an ultrasound, microcalcifications represent areas of papillary thyroid cancer. Since calcifications can also be seen in benign thyroid nodules, the aim of the current study was to examine whether ultrasound calcifications truly predict a) calcifications in thyroid tissue itself and b) the diagnosis of papillary thyroid cancer.

THE FULL ARTICLE TITLE

Bilici S et al Histopathological investigation of intranodular echogenic foci detected by thyroid ultrasonography. Am J Otolaryngol 2017;38:608-13. Epub July 5, 2017.

SUMMARY OF THE STUDY

This study included 81 thyroid nodules from 81 patients who underwent thyroidectomy at a single center in Turkey between January 2013 and March 2014. Patients were included if the same ultrasound features were observed by two different radiologists. The presence of calcifications in both the ultrasound image and the surgical tissue was noted and the relationship between cancer and calcification patterns was determined.

Of the 81 patients, 63% were female and the average age was 50 years. Ultrasound calcifications were detected in 42 (51.9%) of all nodules, although only 22 of those (27%) were true microcalcifications and the other 20 (24.7%) were macrocalcifications. Of the 42 nodules with any type of ultrasound calcification, 28 of them (66.7%) actually had calcifications in the tissues examined after surgery. However, only 11 of the 22 nodules (50%) with ultrasound microcalcifications contained calcifications in the thyroid tissue. In fact, 5 (12.8%) nodules without ultrasound calcifications were found to have calcifications on in the thyroid tissue.

Overall 23 of the 42 (54%) nodules with any type of ultrasound calcification were cancer, but 13 of the 29 nodules (45%) without ultrasound calcifications were also found to be cancer. Consequently, the rate of cancer was not different between nodules with or without ultrasound calcifications. Finally, only 12 of the 22 nodules (54%) with microcalcifications on ultrasound were found to be cancer and there was no difference in the rate of thyroid cancer between nodules with ultrasound microcalcifications and macrocalcifications.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Overall patterns of microcalcifications and macrocalcifications seen on ultrasound were only loosely correlated with calcification in thyroid tissue. Furthermore, the presence of either of these types of calcifications did not reliably predict cancer. These results highlight the importance of evaluating multiple criteria for thyroid cancer, including those obtained through clinical history, physical examination and diagnostic imaging, and not relying on the presence or absence of a single finding.

— Phillip Segal MD FRCPC

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ATA THYROID BROCHURE LINKS

Thyroid Cancer (Papillary and Follicular): https://www.thyroid.org/thyroid-cancer/
Thyroid Nodules: https://www.thyroid.org/thyroid-nodules/

ABBREVIATIONS & DEFINITIONS

Thyroid nodule: an abnormal growth of thyroid cells that forms a lump within the thyroid. While most thyroid nodules are non-cancerous (Benign), ~5% are cancerous.

Thyroid Ultrasound: a common imaging test used to evaluate the structure of the thyroid gland. Ultrasound uses soundwaves to create a picture of the structure of the thyroid gland and accurately identify and characterize nodules within the thyroid. Ultrasound is also frequently used to guide the needle into a nodule during a thyroid nodule biopsy.

Papillary thyroid cancer: the most common type of thyroid cancer. There are 4 variants of papillary thyroid cancer: classic, follicular, tall-cell and noninvasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP).

Microcalcifications: Small flecks of calcium within a thyroid nodule, usually seen as small bright spots on ultrasonography. These are frequently seen in nodules containing papillary thyroid cancer.

Macrocalcifications: Large flecks of calcium that can be seen either inside a thyroid nodule or in the periphery (so called egg-shell/rim calcifications), usually seen as large bright spots on ultrasonography.

Thyroidectomy: surgery to remove the entire thyroid gland. When the entire thyroid is removed it is termed a *total thyroidectomy*. When less is removed, such as in removal of a lobe, it is termed a *partial thyroidectomy*.

Thyroid biopsy: a simple procedure that is done in the doctor's office to determine if a thyroid nodule is benign (non-cancerous) or cancer. The doctor uses a very thin needle to withdraw cells from the thyroid nodule. Patients usually return home or to work after the biopsy without any ill effects

Thyroid Awareness Monthly Campaigns

The ATA will be highlighting a distinct thyroid disorder each month and a portion of the sales for Bravelets™ will be donated to the ATA. The month of **May** is **International Thyroid Awareness Month** and a bracelet is available through the **ATA Marketplace** to support thyroid cancer awareness and education related to thyroid disease.