



## THYROID NODULES

# Using the Thyroid Imaging Reporting and Data Systems (TIRADS) will decrease the number of thyroid nodule biopsies while improving diagnostic accuracy

### BACKGROUND

Thyroid nodules are very common, occurring in up to 50% of people in the United States. The concern of any nodule is whether it is a thyroid cancer. Fortunately, ~95% of thyroid nodules are benign. At present, the only way to make a diagnosis of thyroid cancer prior to surgery is with a thyroid biopsy. Ultrasound is the imaging method of choice for evaluating thyroid nodules and the appearance on ultrasound in addition to size are the key factors determining the need for biopsy. The more suspicious features thyroid nodule has the lower is the threshold for thyroid biopsy. In rare cases, the appearance on ultrasound alone can be diagnostic of either cancerous or benign nodules. A lot of research is being done to expand the characteristics of a nodule on ultrasound into a risk assessment of the likelihood of thyroid cancer.

The American College of Radiology Thyroid Imaging Reporting and Data Systems (TIRADS) is a 5 point classification to determine the risk of cancer in thyroid nodules based on ultrasound characteristics. The aim of this study was to compare the biopsy rate and diagnostic accuracy before and after applying TIRADS risk stratification to patients with thyroid nodules.

### THE FULL ARTICLE TITLE

Hoang JK et al 2018 Reduction in thyroid nodule biopsies and improved accuracy with American College of Radiology Thyroid Imaging Reporting and Data System. *Radiology* 287:185–193. Epub 2018 Mar 2. PMID: 29498593.

### SUMMARY OF THE STUDY

The study consisted of 100 nodules in 92 patients who underwent thyroid biopsy and/or surgical resection between April 2009 and May 2010 at a single institution. All biopsied nodules had dedicated video imaging reviewed. The ultrasound images were reviewed by 11

radiologists from 9 different institutions. The radiologists were blinded to the cytology and pathology results. Of these, 3 radiologists were considered experts, as they were part of the committee that developed the TIRADS criteria. Their consensus reports of the US findings were used as the “truth” for the nodule features. The other 8 radiologists—2 radiologists in academic practice and 6 in private practice—were test readers and had no knowledge of TIRADS guidelines. All the radiologists reviewed the ultrasound images and evaluated the nodules for the five features used in TIRADS, including composition (what the nodule looked like), echogenicity (darkness), shape, margin, and echogenic foci (bright spots on the images). The test readers assigned each nodule a cancer risk category that matched the five risk-stratification levels used in TIRADS (highly suspicious, moderately suspicious, mildly suspicious, not suspicious, and benign). The test readers also noted whether they would recommend a biopsy for each nodule. A comparison was made between the test readers’ recommendations with and without TIRADS guidelines.

The average age of the patients was 52 years. Of the 100 nodules that were evaluated, the average size was 2.7 cm. There were 15 cancers (15%) identified, with an average size of 2.2 cm, including 11 classic papillary thyroid cancer (73%) and 4 follicular variant of papillary thyroid cancer (27%). The average number of biopsies recommended by the 8 test readers was 80 with their own practice pattern and 57 with TIRADS guidelines. After applying TIRADS guidelines, the readers of each test had a reduction in the number of biopsies that ranged from 5% to 41%. After the TIRADS guidelines were applied, 5 cancers were not recommended for biopsy by some of the test radiologists and 3 cancers were not recommended for follow-up or biopsy because of incorrect categorization of ultrasound features by 2 of the 8 test readers.





## THYROID NODULES, continued

If test readers had used guidelines from other societies (the American Thyroid Association, Korean TIRADS, or French TIRADS), the average number of nodules recommended for biopsy would have been 77, 85, and 74, respectively, as compared with 57 nodules with TIRADS. The 2 cancerous nodules that did not meet the criteria for biopsy according to TIRADS guidelines also did not meet criteria for biopsy with any of the other guidelines.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

By using the TIRADS guidelines from the American College of Radiology, one can see a significant reduction in the number of thyroid nodules recommended for biopsy and an improvement in the accuracy of recommendations for nodule management. With this system, the vast majority of the cancerous nodules will be recommended for biopsy or follow-up ultrasound.

— Alan P. Farwell, MD, FACE

### ATA THYROID BROCHURE LINKS

Thyroid Nodules: <https://www.thyroid.org/thyroid-nodules/>

Fine Needle Aspiration Biopsy of Thyroid Nodules: <https://www.thyroid.org/fna-thyroid-nodules/>

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

### 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.

**Thyroid fine needle aspiration biopsy (FNAB):** 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.

**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).

