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THYROID CANCER

The TIRADS ultrasound system can decrease unnecessary biopsies of PET-positive thyroid nodules

BACKGROUND

PET scanning is a type of imaging commonly used to locate areas of cancer in the human body. This is done in patients with a diagnosed cancer to see if it has spread to other parts if the body. This works because cancer cells are more active than normal cells and will take up more of the tracer (18F-FDG) and will light up positive on the PET scan. However, not all areas that are PET-positive are cancer. Some thyroid nodules are PET-positive and occasionally, PET scanning will identify unexpected/previously undetected thyroid nodules. Up to 1/3 of PET-positive thyroid nodules will end up being thyroid cancer. For this reason, most experts recommend biopsy of these nodules, especially when they are >1 cm in diameter, in order to determine whether or not a thyroid cancer is present. Unfortunately, thyroid biopsy results do not always rule out cancer and, in such cases, thyroid surgery is often needed. This means that some surgically removed thyroid nodules will ultimately be found to be benign (noncancerous).

An important area of research is the development of new technologies that might allow doctors to avoid thyroid surgery (and even thyroid biopsy) for patients having PET-positive thyroid nodules, but for whom these nodules are benign. One such technology is thyroid ultrasound, which can identify thyroid nodule features that may predict the presence of thyroid cancer. Several different systems have been developed for predicting, on the basis of ultrasound findings, whether or not a thyroid cancer is present in a thyroid nodule. One of these systems is called TIRADS. The TIRADS system places thyroid nodules into one of four different categories (2 thorough 5), depending on how many ultrasound features suspicious for thyroid cancer are identified. The greater number of suspicious ultrasound features identified, the higher the probability of thyroid cancer and the higher the TIRADS category (with TIRADS category 5 having the highest risk of cancer and category 2 having the lowest risk). It is important to note that, although thyroid cancer risk does increase as the TIRADS category number increases, the TIRADS system is by no means perfect. A TIRADS 5 category, for example, does not mean a 100% probability of thyroid cancer.

The purpose of this study is to determine if the TIRADS ultrasound system can predict the absence of thyroid cancer in previously undetected thyroid nodules identified during PET scanning and, thus, avoid thyroid biopsy.

THE FULL ARTICLE TITLE

Trimboli P et al 2018 Fine-needle aspiration in all thyroid incidentalomas at 18F-FDG PET/CT: can EU-TIRADS revise the dogma? Clin Endocrinol (Oxf) 89:642–648. Epub 2018 Aug 6. PMID: 30019402.

SUMMARY OF THE STUDY

The authors looked at every PET scan done at their institution over a four-year period (between 2014 and 2017). They ultimately identified 66 cases for which PET scanning identified an unexpected thyroid nodule and for which thyroid surgery was performed. For this group, 13 thyroid nodules were found to be cancerous, while the remaining 53 nodules were benign. In evaluating the TIRADS category for each of the 13 cancerous nodules, the authors found that none of these cancers were classified in the TIRADS 2 category, while the number of cancers increased with each increase in TIRADS category number (11 of the 13 cancers were classified as TIRADS 5).

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study shows that the TIRADS system for estimating thyroid cancer risk among thyroid nodules identified unexpectedly by PET scanning may be useful for further determining the risk of thyroid cancer in these cases. Since no thyroid cancers were present for any TIRADS category <3, this study suggests that biopsy, and potentially surgery, is not be needed for PET-positive nodules classified into these TIRADS categories. It is important to note that this

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study is quite small, with relatively few patients included for assessment, so the results need to be validated in a larger study. Nonetheless, the results of this study certainly do justify larger studies examining the role of ultrasound in improving diagnosis of thyroid cancer for nodules identified by PET scanning.

— Jason D. Prescott, MD PhD

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/
Thyroid Surgery: https://www.thyroid.org/thyroid-surgery/

ABBREVIATIONS & DEFINITIONS

Positron-Emission-Tomography (PET) scans: a nuclear medicine imaging test that uses a small amount of radio-labeled glucose (18F-FDG) to identify cancer. Since cancer cells are more active than normal cells, the cancer cells take up more of the radiolabeled glucose and show up on the PET scan. PET scans are frequently combined with CT scans to accurately identify where the cancer is located.

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 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 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.