



THYROID NODULES

Ultrasound imaging of thyroid nodules detected on PET-CT scan

BACKGROUND

Cancer cells are more metabolically active than normal cells and take up glucose to a higher degree than normal cells. Using radiolabeled glucose (18F-2-fluoro-2-deoxy-d-glucose, FDG) and special imaging scans (positron emission tomography, PET and computerized tomography, CT), cancer can be identified in those areas that show increased FDG uptake. These FDG PET-CT are frequently performed in individuals with known cancer, to determine where the cancer may be located. This type of information is used to determine the stage of the cancer and any response to treatment. It is not uncommon for thyroid nodules to be incidentally detected in individuals with no known thyroid problems who may be undergoing a FDG PET-CT scan for an unrelated cancer. In general, nodules that are cancerous may show increased FDG uptake. However, nodules that are overactive and some that are working normally also will take up FDG. This study was performed to determine whether the imaging features of a FDG PET-CT-detected thyroid nodule on neck ultrasound may provide information about the risk of cancer of the nodule(s).

THE FULL ARTICLE TITLE

Beech P et al. Ultrasound stratification of the FDG-avid thyroid nodule. *Clin Radiol* 2016;71:164-9. Epub December 10, 2015.

SUMMARY OF THE STUDY

In this study, the records were reviewed of 47 individuals who had undergone FDG PET-CT scan and were found to have one or more thyroid nodules that concentrated FDG and, thus, were concerning for cancer. All patients underwent a thyroid ultrasound and biopsy of such

nodules. The study was performed in a single institution in Australia. There were data from 48 nodules included in the study. The final diagnosis was based on the biopsy results. The authors reported that 49% of the nodules had features on ultrasound that were suspicious for cancer (very dark appearance, irregular margins, microcalcifications, or increased blood flow). In this group, the results of the biopsy were as follows: benign – 50%, indeterminate – 29% and cancerous – 21%. For the rest of the nodules where there were no suspicious features on ultrasound, the results of the fine needle aspiration biopsy was as follows: benign – 92%, indeterminate – 8%, and malignant – 0%.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study shows that thyroid nodules that are identified on FDG PET-CT scans have a higher risk of cancer than those that do not take up FDG, although most nodules identified on these scans are not cancerous. Importantly, most cancers were found in nodules that had suspicious features on ultrasound; the rate of cancer found on biopsy was much lower in the group that had no suspicious features on ultrasound. This study reinforces ultrasound examination as a standard of care in evaluation of thyroid nodules and can be used to help determine which nodules should be biopsied in patients with pre-existing non-thyroid cancer.

— Anna Sawka, MD

ATA THYROID BROCHURE LINKS

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

Thyroid Cancer: <http://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.

18F-2-fluoro-2-deoxy-d-glucose-positron emission tomography (FDG-PET) and PET-CT: a nuclear medicine imaging test that uses a small amount of

radiolabeled glucose 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 FDG-PET scan. FDG-PET scans are frequently combined with computerized tomography (CT) scans (ie. PET-CT) to accurately identify where in the body a cancer may be located.



THYROID NODULES, continued

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.

Indeterminate thyroid biopsy: this happens usually when the diagnosis is a follicular or hurthle cell lesion. Follicular and hurthle cells are normal cells found in the thyroid. Current analysis of thyroid biopsy results cannot differentiate between follicular or hurthle cell cancer from noncancerous adenomas. This occurs in 15-20% of biopsies and often results in the need for surgery to remove the nodule.