



THYROID NODULES

Volume doubling time does not predict cancer in follicular neoplasm nodules

BACKGROUND

Although thyroid nodules are very common, only 5-7% of them are cancerous. Biopsy of a thyroid nodule can help to differentiate between benign and cancerous nodules, however, its ability to predict cancer is not 100%. Using the Bethesda System, 90-95% of biopsy samples are satisfactory for interpretation with 55-74% being reported as benign, 2-5% being reported as cancer and the rest being reported as indeterminate, meaning a diagnosis cannot be made based on looking at the cells alone. Biopsy performs well for benign or cancer cytology results, as 97-100% of thyroid nodules with benign cytology being benign and 94-96% of thyroid nodules with cancer cytology being cancer. Among the thyroid nodules with indeterminate cytology, up to 25% are reported as follicular neoplasms (FNs). Although less than half (10-40%) of the FNAs are cancer, many patients undergo surgery to remove of the nodule for a definitive diagnosis. Molecular testing can further help determine the cancer risk of thyroid nodules; however, their performance is still not 100%. The goal of this study was to evaluate whether the growth rate of thyroid nodules with FN cytology can predict the presence of cancer.

THE FULL ARTICLE TITLE

Kim M et al 2019 Determining whether tumor volume doubling time and growth rate can predict malignancy after delayed diagnostic surgery of follicular neoplasm. *Thyroid*. 2019 Oct;29(10):1418-1424 Epub Sep 5. PMID: 31375058.

SUMMARY OF THE STUDY

The researchers evaluated patients who underwent thyroid surgery for nodules with FN cytology at a single South Korean medical center between 2014 and 2017. The study included 100 patients who had a thyroid nodule larger than 1 cm, delayed their thyroid surgery more than 1 year after the biopsy showing a follicular neoplasm, and had three or more ultrasound evaluations prior to surgery. Surgical removal of nodules with FN cytology is usually recommended at this institution, however, the study

patients had specific reasons to delay surgery, including pregnancy, other co-existent cancers, patient preference, and initial biopsy showing a lower risk cytology. Therefore, the thyroid nodules were monitored by ultrasound prior to the surgery. The thyroid nodule dimensions were measured on ultrasound and the growth was assessed by calculating the tumor volume doubling time (TVDT).

After the thyroid surgery, 58% of the thyroid nodules with FN cytology were found to be benign and 42% were cancer. The average patient age was 50 years, 82% were female, and the average nodule size at initial ultrasound was 2.0 cm and then 2.5 cm at the time of the surgery. None of these variables or the ultrasound appearance of the thyroid nodules were associated with the presence of cancer.

During an average follow-up of 50 months, both benign and cancerous nodules grew significantly with an increase in their largest dimension and volume measured by ultrasound; however, the rate of growth was not associated with cancer. More than half of both benign and malignant thyroid nodules showed a greater than 50% volume increase at 5 years. In addition, there was no significant difference in the time to achieve greater than 50% volume increase between the two groups. The TVDT for FN nodules ranged from less than 2 years to greater than 10 years. There was no association between the TVDT and the nodule risk of cancer.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

The study showed no significant difference in the growth rate of benign and cancerous thyroid nodules with FN cytology assessed during ultrasound surveillance, suggesting that the tumor volume doubling time is not helpful to predict malignancy in these nodules prior to surgery. Other studies have showed contrasting results; therefore, additional research is needed to find a clear answer to this question.

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THYROID NODULES, continued

ATA THYROID BROCHURE LINKS

Thyroid Nodules: <https://www.thyroid.org/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. Thyroid nodules can be benign (non-cancerous) or malignant (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: a simple procedure that is done in the doctor's office to determine if a thyroid nodule is cancerous or not. 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.

Cytology: a branch of pathology, the medical specialty that examines tissue samples from the body to diagnose different diseases and conditions. Thyroid cytology examines thyroid cells removed during the FNA of thyroid nodules to diagnose thyroid cancer.

Bethesda System for Thyroid Cytopathology: a standardized system to report thyroid FNA specimens, which includes six diagnostic categories: non-diagnostic or unsatisfactory; benign; atypia of undetermined significance or follicular lesion of undetermined significance (AUS/FLUS); follicular neoplasm or suspicious for a follicular neoplasm (FN/SFN); suspicious for malignancy; and malignant.

Indeterminate thyroid biopsy: this happens when a few atypical cells are seen but not enough to be abnormal (atypia of unknown significance (AUS) or follicular lesion of unknown significance (FLUS)) or 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.

Follicular neoplasm: A tumor that can be benign such as a thyroid adenoma, or malignant such as a follicular thyroid cancer. Fine needle aspiration cannot differentiate between benign and malignant tumors, since all follicular neoplasms show similar results with many thyroid cells arranged in small groups (microfollicular pattern).

Follicular thyroid cancer: the second most common type of thyroid cancer.

Molecular testing: techniques used to examine genes and microRNAs expressed in thyroid cells to differentiate between benign and malignant thyroid nodules. The two most common molecular marker tests are the Afirma™ Gene Expression Classifier and ThyroSeq™.

