



THYROID CANCER

Molecular marker studies in papillary thyroid cancer provide information on cancer prognosis

BACKGROUND

Thyroid cancer is the fastest rising cancer in women. The approach to the management of thyroid cancer currently is based on the risk of the thyroid cancer persisting or recurring after initial treatment. This is especially important in low risk thyroid cancers, which are the most common and fastest rising. Recent availability of testing for gene mutations in thyroid biopsy specimens, so-called molecular markers, has provided insight to the prognosis of some thyroid cancers and also to the cause of the cancers. This can allow the identification of cancers that are at high risk vs low risk for spreading outside the thyroid. Already, molecular markers have been helpful in identifying a variant of papillary cancer that may not be a cancer after all. Finally, these molecular markers may be used to determine effective treatment approaches.

This study uses molecular markers to determine both prognosis of papillary cancer and the importance of papillary cancer spreading to the lymph nodes of the neck.

FIRST FULL ARTICLE TITLE

Ren H et al 2018 Co-existence of *BRAF*^{V600E} and *TERT* promoter mutations in papillary thyroid carcinoma is associated with tumor aggressiveness, but not with lymph node metastasis. *Cancer Manag Res*. Epub 2018 May 3. PMID: 29760568.

SUMMARY OF THE STUDY

The subjects of this study were 342 consecutive patients who underwent thyroidectomy for papillary thyroid carcinoma. Of these, 85% underwent total thyroidectomy and the remainder underwent lobectomy. Pre-op neck ultrasound indicated that 251 patients did not have abnormal lymph nodes prior to surgery while 91 patients did have evidence for the spread of the cancer into the

lymph nodes of the neck. Central lymph node dissections were performed in all patients and 94% also underwent lateral lymph node dissections. *BRAF* V600E and the *TERT* promoter mutations C228T and C250T were analyzed after in all of the surgery specimens.

There were 99 men and 243 women, ranging in age from 13 to 81 years, with an average age of 42 years. Microcarcinomas (<1 cm) were present in 39% of the patients. The *BRAF* V600E mutation was present in 270 patients (*BRAF*⁺) and absent in 72 patients (*BRAF*⁻), *TERT* promoter mutations were present in only 12 patients. All patients who were positive for the *TERT* promoter mutations also were positive for the *BRAF* V600E mutation. The average age of *BRAF*⁺ patients was about 4 years older than *BRAF*⁻ patients while *BRAF*⁺*TERT*⁺ patients were 26 years older than *BRAF*⁻ patients. A total of 83.3% of *BRAF*⁺*TERT*⁺ patients had extrathyroidal extension as compared 30.7% *BRAF*⁺ patients and 26.4% *BRAF*⁻ patients. The *BRAF*⁺*TERT*⁺ patients also had larger cancers and more advanced disease at diagnosis. However, there was no significant relationship between *BRAF*⁺ or *BRAF*⁺*TERT*⁺ and spread if the cancer to central or lateral neck lymph nodes.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study shows that, in patients with papillary thyroid cancer, *BRAF*⁺*TERT*⁺ status is associated with older patient age, larger cancer size and a more advanced cancer stage, as compared with patients patients who are *BRAF*⁺ or *BRAF*⁻. This and further studies using molecular markers will help doctors identify cancers that are more aggressive and which require more aggressive treatment.

— Alan P. Farwell, MD, FACE

ATA THYROID BROCHURE LINKS

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





THYROID CANCER, continued

ABBREVIATIONS & DEFINITIONS

Molecular markers: genes and microRNAs that are expressed in benign or cancerous cells. Molecular markers can be used in thyroid biopsy specimens to either to diagnose cancer or to determine that the nodule is benign. The two most common molecular marker tests are the Afirma™ Gene Expression Classifier and Thyroseq™

Mutation: A permanent change in one of the genes.

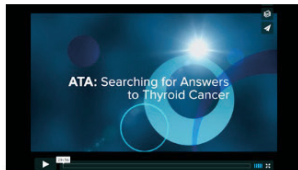
Genes: a molecular unit of heredity of a living organism. Living beings depend on genes, as they code for all proteins and RNA chains that have functions in a cell. Genes hold the information to build and maintain an organism's cells and pass genetic traits to offspring.

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).

Papillary microcarcinoma: a papillary thyroid cancer smaller than 1 cm in diameter.

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

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