



THYROID CANCER

Presence of gene mutations in patients with papillary thyroid cancer are associated with more aggressive cancer

BACKGROUND

Papillary cancer is the most common thyroid cancer. While most patients with this cancer have an excellent prognosis, a few patients do not do well, with recurrent cancer that requires more aggressive therapy. Many investigators are studying to identify which type of papillary thyroid cancers are more aggressive. The focus of these studies is on mutations in cancer-associated genes, especially a gene known as BRAF. Mutations in another cancer-associated gene TERT was recently found to be common in anaplastic thyroid cancer and poorly differentiated thyroid cancer. This study was undertaken to find out the effect of BRAF and TERT gene mutations on prognosis of patients with papillary thyroid cancer.

THE FULL ARTICLE TITLE

Xing M et al. BRAF V600E and TERT Promoter Mutations Cooperatively Identify the Most Aggressive Papillary Thyroid Cancer With Highest Recurrence. *J Clin Oncol*. July 14, 2014 [Epub ahead of print].

SUMMARY OF THE STUDY

This study included 507 patients who had surgery for papillary thyroid cancer at the Johns Hopkins Hospital between 1990 and 2012 and were followed for average of 2 years. Thyroid cancer specimens from each patient were obtained and examined for the presence of a mutations in the BRAF or TERT gene or mutations in both genes. A mutation in the BRAF gene was detected in 38% and the TERT mutation in 12% of all 507 patients. Cancer

recurred in 26% of patients with BRAF mutation and in 57% of patients with TERT mutation while recurrence was seen in 10% without BRAF mutation and in 11% of patients without TERT mutation. The risk of recurrent cancer was 3.1 times higher in patients with BRAF mutation and 3.3 times higher in patients with TERT mutations as compared to patients without BRAF or TERT mutations. The presence of both BRAF and TERT mutations were associated with larger cancers and the spread of cancer into surrounding tissue as well as outside of the neck. In addition, 69% of patients with both BRAF and TERT mutations had recurrent cancer. The life expectancy was lower in patients with BRAF or TERT mutations and was lowest in patients with both BRAF and TERT mutations as compared to patients without BRAF or TERT mutations.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Detection of mutations in cancer-associated genes BRAF and TERT may identify the few number of patients with papillary thyroid cancer that have a worse prognosis. The authors of this study suggest that cancers that contain mutations in the BRAF and TERT genes require more aggressive treatment, although that needs to be studied.

— Jamshid Farahati MD

ATA THYROID BROCHURE LINKS

Thyroid cancer: <http://www.thyroid.org/cancer-of-the-thyroid-gland>

ABBREVIATIONS & DEFINITIONS

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.

Anaplastic thyroid cancer: a very rare but very aggressive type of thyroid cancer. In contrast to all other types of thyroid cancer, most patients with anaplastic thyroid cancer die of their cancer and do so within a few years.

Cancer recurrence: this occurs when the cancer comes back after an initial treatment that was successful in destroying all detectable cancer at some point.



THYROID CANCER, continued

Cancer-associated genes: these are genes that are normally expressed in cells. Cancer cells frequently have mutations in these genes. It is unclear whether mutations in these genes cause the cancer or are just associated with the cancer cells. The cancer-associated genes important in thyroid cancer are BRAF, RET/PTC and RAS

BRAF gene: this is gene that codes for a protein that is involved in a signaling pathway and is important for cell

growth. Mutations in the BRAF gene in adults appear to cause cancer.

TERT gene: this is a gene that contain instructions for making a subunit of the enzyme telomerase, which maintains structures called telomers. Telomers protect chromosomes from abnormally sticking or breaking down. TERT mutations are common in advanced forms of thyroid cancer.