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HYPERTHYROIDISM

T_3-predominant Graves' disease

BACKGROUND

Graves' disease is one of the most common causes of hyperthyroidism. It is caused by thyroid stimulating antibodies that attack the thyroid and turn it on, producing high levels of the thyroid hormones T_4 and T_3. Most patients with Graves' disease respond well to medical treatment, but a small number of patients have persistent increased levels of T_3 despite taking antithyroid medication (T_3-predominant Graves' disease). This group of patients tends to have a more severe form of the disease with higher thyroid hormone levels and more thyroid gland enlargement, as well as relative resistance to treatment with antithyroid medications. The present study was done to determine the basis for the increased T_3 production in T_3-predominant Graves' disease.

THE FULL ARTICLE TITLE:

Ito M et al. Type 1 and type 2 iodothyronine deiodinases in the thyroid gland of patients with 3,5,3'-triiodothyronine-predominant Graves' disease. Eur J Endocrinol. October 11, 2010 [Epub ahead of print].

SUMMARY OF THE STUDY

Data from 31 patients who underwent thyroidectomy for treatment of Graves' disease were evaluated, 13 patients with T_3-predominant Graves' disease and 18 patients with "common-type" Graves' disease. In addition, deiodinase enzyme activity was determined from thyroid tissue obtained at surgery. The deiodinase enzymes convert T_4 to T_3 by removing an iodine molecule form T_4. It was found that patients with T_3-predominant Graves' disease were significantly younger and had much larger thyroid glands. Thyroid stimulating antibodies were 40-fold greater and thyroid-stimulating antibody 3-fold greater in patients with T_3-predominant Graves' disease compared to those with "common-type" Graves' disease. Levels of the deiodinase enzymes were significantly higher in patients with T_3-predominant Graves' disease compared to patients with the usual Graves' disease and correlated with the high levels of the thyroid stimulating antibodies.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

T_3-predominant Graves' disease was first described in 1984 and has been a form of Graves' disease that has been particularly difficult to treat with antithyroid medications alone. The current study has given us a better understanding of the mechanisms underlying T_3-predominant Graves' disease. In so doing, this study may make it easier to diagnose this severe form of Graves' disease and may point the was toward newer therapies for Graves' disease in general.

— Frank Cranz, MD

ATA THYROID BROCHURE LINKS

Graves disease: http://thyroid.org/patients/patient_brochures/graves.html

Hyperthyroidism: http://thyroid.org/patients/patient_brochures/hyperthyroidism.html

Thyroid Function Tests: http://thyroid.org/patients/patient_brochures/function_tests.html

ABBREVIATIONS & DEFINITIONS

Hyperthyroidism: a condition where the thyroid gland is overactive and produces too much thyroid hormone. Hyperthyroidism may be treated with antithyroid meds (Methimazole, Propylthiouracil), radioactive iodine or surgery.

Graves' disease: the most common cause of hyperthyroidism in the United States. It is caused by antibodies that attack the thyroid and turn it on.

Thyroxine (T_4): the major hormone secreted by the thyroid gland. Thyroxine is broken down to produce Triiodothyronine which causes most of the effects of the thyroid hormones.

Triiodothyronine (T_3): the active thyroid hormone, usually produced from thyroxine.

Deiodinase enzymes: these enzymes convert T_4 to T_3 on the cellular level by removing an iodine molecule from T_4.