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HYPOTHYROIDISM

Diagnosis and treatment of hypothyroidism in patients with pituitary tumors

BACKGROUND

The pituitary gland is an endocrine gland that sits at the base of the brain and secretes hormones that control thyroid and adrenal function, growth and reproduction. The pituitary gland secretes TSH to control thyroid function. The vast majority of hypothyroidism is caused by thyroid gland failure (primary hypothyroidism) and is associated with increased TSH levels. Hypothyroidism due to pituitary problems (central hypothyroidism) is associated with normal or low TSH levels in the setting of low thyroid hormone levels. The most common pituitary problems to cause central hypothyroidism are tumors of the pituitary gland. Treatment of hypothyroidism in these patients is complex because the TSH level cannot be used to help determine the correct dose. Common practice is to use the dose of Levothyroxine which results in a free T_4 blood level in the middle to upper part of the reference range. This practice may not result in an appropriate or safe level in all patients. This study was performed to determine if free T_4 levels in a group of treated patients with pituitary tumors were similar to the levels in patients with typical hypothyroidism or other thyroid disorders. The aim of the study was to reassess the proper range of free T_4 levels in patients with hypothyroidism who also have pituitary tumors.

THE FULL ARTICLE TITLE:

Koulouri O et al. Diagnosis and treatment of hypothyroidism in TSH deficiency compared to primary thyroid disease: pituitary patients are at risk of under-replacement with Levothyroxine. Clin Endocrinology. 2011 doi:10.1111/j.1365-2265.2011.03984.x.

SUMMARY OF THE STUDY

A total of 514 patients with pituitary tumors were studied. Some pituitary tumors were "low risk" with small tumors not requiring treatment and some were "high risk" with large tumors or had prior treatment with surgery and/or radiation to the pituitary. Their free T_4 blood levels were compared to levels in patients with typical primary hypothyroidism and other patients with thyroid disease. Approximately 38% of the "high risk" pituitary patients on thyroid hormone therapy had very low free T_4 levels, suggesting under-treatment in many of these patients. On the other hand, if all pituitary patients treated with thyroid hormone had free T_4 levels in the middle to upper normal range, 1/3 – ½ of them may be over-treated as compared to patients with primary hypothyroidism.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Patients with hypothyroidism from pituitary tumors should be treated on an individual basis using clinical signs. The goal of the free T_4 test should be close to the mid-normal range. Due to patient variables, an alternative treatment plan could be used by giving the Levothyroxine dose based on body weight (e.g. 1.3 mcg/kg weight). At present, there is no completely reliable method to restore the thyroid hormone levels to the exact level which is correct in every patient. Individual therapy is needed to avoid the consequences of over and under-treatment.

— Jerrold Stock, MD

ATA THYROID BROCHURE LINKS

Hypothyroidism: http://thyroid.org/patients/patient_brochures/hypothyroidism.html

Thyroid Hormone Treatment: http://thyroid.org/patients/patient_brochures/hormonetreatment.html

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HYPOTHYROIDISM, continued

ABBREVIATIONS & DEFINITIONS

Pituitary gland: this endocrine gland sits at the base of the brain and secretes hormones that control thyroid and adrenal function, growth and reproduction. The pituitary gland secretes TSH to control thyroid function.

Hypothyroidism: a condition where the thyroid gland is underactive and doesn't produce enough thyroid hormone. Treatment requires taking thyroid hormone pills.

Primary hypothyroidism: the most common cause of hypothyroidism cause by failure of the thyroid grand.

Central hypothyroidism: a rare cause of hypothyroidism where the thyroid gland is normal and the problem is inadequate TSH secretion from the pituitary gland.

TSH: thyroid stimulating hormone — produced by the pituitary gland that regulates thyroid function; also the best screening test to determine if the thyroid is functioning normally.