



THYROID HORMONE AND PREGNANCY

Hypothyroxinemia and risk for delays in brain development

WHAT IS THE STUDY ABOUT?

Thyroid hormone is essential for the brain of a baby to develop normally during pregnancy. For at least the first half of pregnancy, the fetus gets thyroid hormone from the mother. It is clear that brain development of the fetus may be harmed if the mother is hypothyroid during this time. What is less clear is if there are any subtle effects on brain development if the thyroid hormone levels are on the low side in the woman who does not have hypothyroidism. The goal of this study was to examine the association between low thyroid hormone levels (hypothyroxinemia) in pregnant women and a variety of studies of brain development in their children.

THE FULL ARTICLE TITLE:

Henrichs J et al. Maternal thyroid function during early pregnancy and cognitive functioning in early childhood: the Generation R Study. *J Clin Endocrinol Metab* 2010; jc.2010-0415 [pii];10.1210/jc.2010-0415 [doi].

WHAT WAS THE AIM OF THE STUDY?

The aim of this study was to examine the association between low thyroid hormone levels (hypothyroxinemia) in pregnant women and a variety of studies of brain development in their children.

WHO WAS STUDIED?

The study group included 3,659 pregnant women and their children, the so-called Generation R study, in Rotterdam, the Netherlands.

HOW WAS THE STUDY DONE?

The data was obtained from April 2002-January 2006 in pregnant woman and their children. Thyroid hormone measurements were obtained from women early in pregnancy. Their children had their thyroid hormone measured beginning at birth. The children's verbal (language) and nonverbal brain development was examined at 18 and 30 months by a test known as the MacArthur Communicative Development Inventory.

Maternal mild and severe hypothyroxinemia were defined as normal TSH levels and FT₄ concentrations in early pregnancy below the 10th percentile (FT₄, <0.91 ng/dl) and the 5th percentile (FT₄, <0.85 ng/dl), respectively.

WHAT WERE THE RESULTS OF THE STUDY?

The results showed that 1.5% of the mothers had hypothyroidism, 8.5% had mild hypothyroxinemia and 4.3% had severe hypothyroxinemia. There was a dose-response relationship in the lower range of the thyroid hormone distribution with verbal and nonverbal delays in early childhood. This means that the lower the T₄ level, the worse the delay.

HOW DOES THIS COMPARE WITH OTHER STUDIES?

Other studies have shown similar results, although most of the studies examined hypothyroid pregnant women while this study included all women in the group.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study shows that low T₄ levels in the mother can have adverse affects on the brain development of the fetus even if the mother does not have hypothyroidism. The study suggests that pregnant women with low T₄ levels should be treated with thyroid hormone early even if they are not hypothyroid.

— Heather Hofflich, MD

ATA THYROID BROCHURE LINKS

Thyroid and Pregnancy: http://thyroid.org/patients/patient_brochures/pregnancy.html

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

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

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THYROID HORMONE AND PREGNANCY, continued

ABBREVIATIONS & DEFINITIONS

Thyroxine (T₄) — 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.

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

Thyroid hormone therapy — patients with hypothyroidism are most often treated with Levothyroxine in order to return their thyroid hormone levels to normal.

MacArthur Communicative Development Inventory — a psychological test that examines both verbal (language) and non-verbal brain development.