

Mom's Hypothyroidism Affects Baby's Eye Function

BY JOHN R. BELL
Associate Editor

NEW YORK — Maternal hypothyroidism during pregnancy appears to negatively affect the visual processing centers of the infant brain, according to research presented at the annual meeting of the American Thyroid Association.

Dr. Joanne Rovet of the Hospital for Sick Children, Toronto, reported findings from a study of 36 children of women diagnosed with hypothyroidism before or during pregnancy who were currently being treated with levothyroxine. Of the mothers, 78% were diagnosed before pregnancy and 22% during pregnancy. Infants were a mean age of 8 months when tested. In all, 55% of the infants were male; all were tested by an ophthalmologist to ensure they had normal refraction. A group of 26 control infants (mean age 7 months; 54% male) were born to mothers whose euthyroid status was confirmed at the time of testing and during follow-up.

Thyroid stimulating hormone (TSH) levels were not taken from all mothers in all trimesters. However, mean TSH levels for the study mothers were 12.07 mIU/L in the first trimester, 2.87 mIU/L

in the second trimester, and 1.92 mIU/L in the third trimester. In the first trimester, TSH ranged from 0.01 to 100, and 16% of mothers had low TSH in the first trimester.

Mean maternal levels of free thyroxine (free T_4) were 13.4, 13.9, and 15.9 pmol/L in each successive trimester. Overall, 20% of women had low thyroid hormone levels in the first trimester, as did 18% in the second trimester.

Among women whose data were available, maternal TSH levels were 13.07 mIU/L in the first trimester, 2.87 mIU/L in the second trimester, and 1.92 mIU/L in the third trimester.

Visual acuity and contrast sensitivity were tested via application of visual stimuli, with brain activity measured at 6 Hz, 10 Hz, and 15 Hz using the Power Diva system. This system measures the neuroelectric signal in relation to the amount of contrast to produce a visual evoked potential (VEP).

Although there was no difference in visual acuity between the study infants and the control infants, there was reduced contrast sensitivity among the study infants, primarily in those whose mothers had low TSH levels. In particular, off-

spring of mothers who had low TSH in the second half of pregnancy had significantly lower contrast sensitivity.

In addition, free T_4 was not linked with reduced contrast sensitivity in the first half of pregnancy, when levels of free T_4 were relatively uniform; in the second half, however, children of the mothers who now had lower free T_4 levels had significantly reduced contrast sensitivity.

Thus, although maternal hypothyroidism was not seen to affect neonatal visual acuity, it was linked with reduced contrast sensitivity, Dr. Rovet concluded. This might be a factor in the association found in previous studies between high maternal TSH and off-

spring reading disability. She noted that the effect is specific to the magno pathway.

Dr. Rovet and colleagues also found visual-spatial and visual-motor disabilities in offspring of women with low free T_4 levels. Children of mothers with a free T_4 level below 11.2 pmol/L in the first trimester or in the third trimester had significantly poorer visual-spatial and visual-motor abilities, she said.

This research echoes the findings of a study of 42 preterm infants by Dr. Rovet and colleagues that was presented as a poster at the meeting. In that study, early preterm infants had both lower TSH levels and longer VEP measures than did infants born less prematurely. ■

Congenital Hypothyroidism Tied to Behavior Problems

BY JOHN R. BELL
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Congenital hypothyroidism is associated with a smaller caudate nucleus, lower levels of attention, and lower behavior ratings, even in children who started treatment as infants, according to research presented at the annual meeting of the American Thyroid Association.

Santhosh Sekharan, a pharmacology research student at the Hospital for Sick Children, Toronto, analyzed brain scans and test scores of 15 children (aged 10-15 years) with congenital hypothyroidism. The hypothyroidism was caused by thyroid dysgenesis in 11 patients (including 4 with athyrotic dysgenesis and 7 with ectopic thyroid dysgenesis) and hormonal dysgenesis in 4 patients. Treatment for this cohort started at a mean age of 13 days, at a median starting dose of 19.4 mcg/kg of thyroxine (T_4). There were 17 control children, for whom prematurity and head injury were exclusion criteria.

The participants and the control group underwent testing for intelligence, memory, and attention, as well as a 1-hour MRI scan, and each mother completed questionnaires assessing her child's behavior.

MR scans revealed that the left and right caudate volumes of the children with congenital hypothyroidism were significantly smaller than were those of the control children. However, among the hypothyroid participants, caudate volume did not vary according to the etiology of the hypothyroidism (athyrotic dysgenesis, ectopic thyroid dysgenesis, or hormonal dysgenesis). Nor did caudate volume differ by age at the inception of treatment, Mr. Sekharan reported.

Greater left-caudate volume predicted higher attention scores, whereas greater right-caudate volume was associated with better scores on parental ratings of behavior.

"Because thyroid hormone is so crucial for early brain development, children with [congenital hypothyroidism] often have severe brain damage and may suffer mental retardation," he said. "Thankfully, with the advent of newborn screening, these kids can be diagnosed and, more importantly, treated right after birth."

Congenital hypothyroidism affects 1 in 2,500 newborns in North America and can result from thyroid dysgenesis, hormonal dysgenesis, or abnormal regulation of thyroid hormone synthesis, he noted. ■

