Medical Xpress

High-normal thyroid hormone level in pregnancy may affect fetal brain development

March 6 2015

A new study finds that not only low but also high maternal thyroid hormone levels during early pregnancy may significantly lower the infant's IQ later in childhood. The study results, which will be presented Thursday at the Endocrine Society's 97th annual meeting in San Diego, suggest that the common practice of treating pregnant women who have mild thyroid hormone deficiency may pose unexpected risks to the developing baby's brain.

Doctors already know that low thyroid hormone levels in pregnant women are linked to lower child IQ scores as well as other risks to the fetus. Based on current evidence, treatment guidelines from the American Thyroid Association in 2011 and the Endocrine Society in 2012 recommend medical treatment of pregnant women with subclinical hypothyroidism. In this mild form of thyroid disease, there is an increased amount of thyroid-stimulating hormone (TSH), the substance that spurs production of and maintains adequate amounts of the thyroid hormones, T3 and T4, which control how your body uses energy.

"There is consensus to treat subclinical hypothyroidism because it is generally believed that the potential benefits of treatment outweigh the potential risks of overtreatment," said Tim Korevaar, MD, the study's lead investigator and a PhD student at Erasmus University in Rotterdam, the Netherlands. "There was virtually no evidence in humans until now that mildly elevated levels of thyroid hormone could also be harmful."

Korevaar and colleagues evaluated data from 3,839 mother-child pairs who participated in the Dutch Generation R Study, an ongoing study from fetal life until young adulthood. Between pregnancy weeks 9 and 18, mothers underwent bloodwork to measure their TSH and free T4—the active form of T4. The children to whom the women gave birth received an IQ test on nonverbal performance tasks between the age of 5 and 8 years.

The researchers found that the average nonverbal IQ of the children significantly decreased 2.1 to 3.8 points below the average of the reference group (those with free T4 levels in the middle of the range) when the mothers' free T4 level was at or above the 89th percentile. This percentile is considered well into the normal range, according to Korevaar. The average child IQ decreased by a similar number of points when maternal free T4 levels were at or below the eighth percentile, indicating low-normal values.

Percentiles were calculated because different countries and hospitals use different methods to measure free T4. What is important in this study, Korevaar said, is that a U-shaped relationship—meaning that both low and high TSH levels were associated with lower child IQ levels—was evident over the entire range of maternal free T4 levels. The researchers found no independent association between women's TSH level and changes in child IQ.

"The proportion of pregnant women with mild thyroid dysfunction who receive thyroid hormone supplementation is rapidly increasing, according to European and American surveys," Korevaar said. "Thyroid hormone supplementation during pregnancy may come with the risk of overtreatment, and even treatment to a high-normal level on thyroid function tests early in pregnancy may not be without risks to the child. We advise physicians to supplement with care."