



THYROID AND PREGNANCY

Risk of birth defects in babies from mothers with hyperthyroidism treated with Methimazole or Propylthiouracil

BACKGROUND:

Hyperthyroidism occurs in up to 4 of every 1,000 pregnancies. The most common cause of hyperthyroidism during pregnancy is Graves' disease. Untreated, hyperthyroidism during pregnancy can cause harm to the mother and the developing baby. Among the complications of hyperthyroidism in pregnancy are miscarriage, early labor, low weight of the newborn, heart failure in the mother and thyroid storm (a severe form of hyperthyroidism). To help avoid these complications, treatment of hyperthyroidism during pregnancy is recommended.

There are two medications available in the US for the treatment of hyperthyroidism. They are Methimazole (MMI) and propylthiouracil (PTU). In non-pregnant adults and in children, MMI is preferred because there is evidence that the other drug, PTU can rarely cause liver problems. For use by pregnant women, however, which medication should be preferred is less clear. Both medications do come in contact with the developing baby and can rarely cause birth defects. Earlier studies from Denmark have shown that PTU causes less frequent and less severe birth defects than MMI. Based on these studies, the 2017 Guidelines of the American Thyroid Association regarding the management of thyroid disease in pregnancy recommends PTU for the treatment of hyperthyroidism in early pregnancy. By the second trimester of pregnancy, however, the organs of the baby have been formed and birth defects from MMI are less likely. It is therefore recommended that by the second trimester, to protect against liver damage, pregnant women with hyperthyroidism should be switched back to MMI.

This study was performed in order to evaluate these recommendations. The study was carried out in a larger number of children than the earlier studies and so provides more accurate data. This study also aimed to examine whether a mother's abnormal thyroid function itself could also be the cause of the birth defects.

FULL ARTICLE TITLE

Andersen SL et al (2019) Maternal thyroid function, use of antithyroid drugs in early pregnancy and birth defects. *J Clin Endocrinology Epub* 2019 Aug 13. PMID: 31408173

SUMMARY OF THE STUDY

The authors looked at how often children were diagnosed with birth defects before reaching 2 years of age. The study looked at the frequency in over one million children born between 1997 and 2016. The researchers compared how often the birth defects occurred in children who were exposed to MMI, or PTU or not exposed at all to these antithyroid drugs. The researchers found that birth defects were seen in only 6.7% of children who were not exposed to ATDs, but were higher for those children exposed to MMI, at 9.6%, and 8.3% for those exposed to PTU. The researchers also checked specifically only the kinds of birth defects previous studies have found were especially common in children of mothers who take antithyroid drugs. Of the children who were not exposed to antithyroid drugs only 3.1% had these kinds of birth defects, but of the children who were exposed to MMI, 6.4% had these kinds of birth defects and only 4.4% were seen in PTU exposed children.

In the children who were exposed to PTU, the birth defects were found only in the face, neck and urinary system, while children who were exposed to MMI, the birth defects involved many organs: some had aplasia cutis (lack of skin in the scalp), esophageal or choanal atresia (back of the nasal passage is blocked) and omphalocele (abdominal wall defect with abdominal organs misplaced outside the abdomen). In children of women who switched from MMI to PTU during the first trimester, 5% had this specific type of birth defects as compared to 3.1% in the unexposed children.

When the authors looked at whether a mother's hyperthyroidism in general seemed to cause birth defects, they





THYROID AND PREGNANCY, continued

found no evidence that it did. However, they did find that that in the women who specifically had overt hypothyroidism (low thyroid hormone levels), there were more birth defects.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study supports the current ATA recommendations that PTU should be used in women with hyperthyroidism during the first trimester of pregnancy, because it

shows that children who were exposed to MMI in the first trimester had more frequent and more severe birth defects. Switching from MMI to PTU in early pregnancy has also been found to lower the risk of birth defects as compared to staying on MMI (although it may be best to avoid MMI use completely in the first trimester). Hyperthyroidism alone was not associated with birth defects, but overt hypothyroidism should be avoided because it increases the risk of birth defects.

— Susana Ebner MD

ATA THYROID BROCHURE LINKS

Thyroid Disease in Pregnancy: <https://www.thyroid.org/thyroid-disease-pregnancy/>

Graves' Disease: <https://www.thyroid.org/graves-disease/>

Hyperthyroidism (Overactive): <https://www.thyroid.org/hyperthyroidism/>

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.

Congenital: Condition that exists at birth.

Methimazole: an antithyroid medication that blocks the thyroid from making thyroid hormone. Methimazole is used to treat hyperthyroidism, especially when it is caused by Graves' disease.

Propylthiouracil (PTU): an antithyroid medication that blocks the thyroid from making thyroid hormone. Propylthiouracil is used to treat hyperthyroidism, especially in women during pregnancy.

Miscarriage: this occurs when a baby dies in the first few months of a pregnancy, usually before 22 weeks of pregnancy.

