Thyroid Foundation of Canada

La Fondation canadienne de la Thyroïde

Reg.No.0618249-11

E.11.A

THYROID DISORDERS AND PREGNANCY

Gregory P. Becks, M.D., F.R.C.P.(C)
Assistant Professor of Medicine
St. Joseph's Health Centre, University of Western Ontario, London, Ontario

Gerard N. Burrow, M.D., F.R.C.P.
Vice Chancellor for Health Sciences and Dean, School of Medicine
University of California, San Diego, La Jolla, California

Thyroid disease is present in 2-5 percent of all women and 1-2 percent of women in the reproductive age group. Not unexpectedly, thyroid problems are common in women who are pregnant. In this article we will view pregnancy broadly to include the antepartum (before pregnancy) and postpartum (after pregnancy) periods, as well as pregnancy itself. Both the baby's and mother's well-being are equally important. In this review we will outline our approach to the common thyroid disorders encountered in pregnancy based on questions frequently asked by our own patients.

SPECTRUM OF THYROID DISEASE IN PREGNANCY

Several of the thyroid disorders which tend to occur during pregnancy are autoimmune in nature. By this we mean that the body develops antibodies directed against thyroid cells, which then affect the way the thyroid gland functions. Antibodies which **damage** the thyroid cells may result in lymphocytic thyroiditis (inflammation of the thyroid), also known as Hashimoto's disease. These damaging antibodies can reduce the function of the thyroid and lead to hypothyroidism. On the other hand, your body can make antibodies against thyroid tissue which can **stimulate** thyroid cell function. In this case, hyperthyroidism due to over-function of the thyroid (Graves' disease) may be the result.

Postpartum thyroiditis is a recently discovered problem that spans the spectrum of both hyper- and hypothyroidism. This condition, which tends to occur immediately after pregnancy, may produce antibodies which damage thyroid tissue, thereby releasing thyroid hormone passively into the bloodstream and producing hyperthyroidism. During the recovery phase, thyroid levels may fall, producing either temporary or permanent thyroid failure. Since this condition is common, occurring in 8-10 percent of all women after pregnancy, postpartum thyroid testing is advisable for all women. (For a complete review of postpartum thyroiditis see **The Bridge**, Vol. 3, No. 3, Fall 1988.)

Thyroid nodules, goiters, and other thyroid problems are also sometimes first detected in pregnancy but are less common.

THYROID DISEASE AND FERTILITY

Hypothyroidism may be associated with an increased frequency of menstrual periods in patients with mild to moderate thyroid failure, and a lack of menstruation (amenorrhea) when hypothyroidism is severe. There may be problems with ovulation and conception due to the hypothyroidism itself or to associated hormonal changes. For example, in some patients with severe hypothyroidism, the pituitary gland produces increased amounts of a hormone known as prolactin. Increased prolactin secretions can "turn off" normal menstrual cycles. Very rarely, autoimmune ovarian problems coexist with hypothyroidism, with destructive antibodies directed against ovarian tissue. Hyperthyroidism may also be associated with irregular or absent menses, and infertility is common. Thyroid disease should be considered in patients undergoing investigation for menstrual problems or infertility. Fortunately, once treated adequately, neither hypo- nor hyperthyroidism have a major impact on fertility.

PLANNING PREGNANCY FOR WOMEN WITH THYROID DISEASE

Hypothyroidism. The diagnosis and treatment of hypothyroidism is straightforward. We advise that the adequacy of thyroid hormone replacement therapy be assessed by thyroid function tests, including the thyroid-stimulating hormone (TSH) level, before proceeding with the pregnancy, so as to minimize any possible risk to the mother or her baby that might occur due to hypothyroidism during pregnancy.

Hyperthyroidism. The investigation and management of hyperthyroidism in young women is a bit more complex. First, radioactive iodine thyroid scanning, used for the diagnosis of hyperthyroidism, as well as radioiodine treatment of hyperthyroidism, should **never** be used until the physician conducting these tests is certain that the patients is **not** pregnant. With regard to treatment, physicians may recommend either antithyroid medications or radioactive iodine in women of reproductive age. In either case it is essential to control the women's hyperthyroid state before proceeding with pregnancy; this usually takes three to six months. A one-to-two-year course of antithyroid medications, hoping for a remission of thyrotoxicosis, is recommended by some physicians. In the interim, effective birth control measures should be used to prevent pregnancy. The concerns raised by the prospect of continuing to take antithyroid drugs in pregnancy are discussed below. Other physicians prefer to use radioiodine to treat women who are contemplating pregnancy, since a complete cure of the of the hyperthyroid condition is assured. Of course, if and when hypothyroidism develops after radioiodine therapy, treatment with thyroid hormone is necessary.

THYROID FUNCTION IN PREGNANCY

Thyroid gland function is normal in pregnancy, although normal pregnant women often develop symptoms and signs suggesting hyperthyroidism, such as rapid heat beat or palpitations, sweating, and heat intolerance. The metabolic rate is also increased in pregnancy, so it is easy to see why hyperthyroidism is often suspected even though

it is actually present in only one out of 1,000 pregnancies. The normal thyroid gland may be slightly larger in pregnancy, but the presence of even a modestly enlarged gland usually means that there is an underlying thyroid problem which requires investigation. The total serum thyroxine (T4) and triiodothyronine (T3) levels are increased in pregnancy due to high levels of estrogen which, in turn, increase the thyroid hormone-binding protein concentrations. Although this makes thyroid functions more difficult to interpret, thyroid hormone production is normal in pregnant women.

The baby's thyroid begins to function after ten to twelve weeks of pregnancy. Thyroid hormones are important for development of the fetal nervous system and these are probably derived from both the baby's thyroid gland secretion as well as small amounts of the mother's thyroid hormone that cross the placenta. Iodine in the mother's diet readily crosses the placenta and is used by the fetal thyroid gland to make thyroid hormone. Iodine deficiency can cause newborn hypothyroidism or mental retardation (cretinism) and is a major world health problem in underdeveloped countries. Since there is an overabundance of iodine in the American diet, disorders caused by a lack of dietary iodine do not occur here.

THYROID DISEASE IN THE MOTHER DURING PREGNANCY

Hypothyroidism. If hypothyroidism is suspected in a pregnant patient, the physician can perform a TSH blood test. Just as in non-pregnant women, the TSH will be increased if hypothyroidism is present. If a woman is already being treated with thyroxine when she becomes pregnant, she should continue to take this medication during pregnancy. Thyroxine is safe to take and is well absorbed during pregnancy. Although there is usually no need for a dose change, some women require somewhat higher doses when they are pregnant. Physicians generally monitor the TSH level to detect even mild hypothyroidism and increase the thyroxine dose, if necessary.

Hyperthyroidism. Thyrotoxicosis (hyperthyroidism) during pregnancy, most often due to Graves' disease, presents a challenge for diagnosis and treatment because of unique fetal and maternal considerations.

The risk of miscarriage and stillbirth is increased if thyrotoxicosis goes untreated, and the overall risks to mother and baby further increase if the disease persists or is first recognized late in pregnancy. The diagnosis is suggested by specific physical signs such as prominent eyes, enlarged thyroid gland, and exaggerated reflexes, and is confirmed by markedly elevated serum thyroid hormone levels. As noted above, radioactive iodine scans or treatment are never performed in pregnancy. However, if a thyroid scan is inadvertently done in pregnancy, this should cause little concern, since the amount of radioactivity delivered to the fetus is barely above the background level in the environment.

On the other hand, if radioactive iodine **treatment** is inadvertantly administered in pregnancy, this raises concerns about the radiation effects on the developing fetus in

early pregnancy. The amount of radiation may approach levels which can be harmful and, after appropriate counseling, some patients may opt for a therapeutic abortion. Still a number of completely normal infants have been born in this situation. Later in pregnancy radioactive iodine can destroy the fetal thyroid, but this is probably not a sufficient reason to end the pregnancy, since recognition and treatment of hypothyroidism shortly after delivery usually assures normal growth and development in the child.

The treatment of choice for thyrotoxicosis during pregnancy is antithyroid medication, either propylthiouracil or methimazole, since radioactive iodine cannot be used. Propylthiouracil (PTU) remains the drug of choice, since it does not cress the placenta as well as methimazole. The initial goal is to control the hyperthyroidism and then use the lowest medication dose possible to maintain the serum thyroid hormone levels in the high normal range. In this way the smaller doses of medications are used, and there seems to be little risk to the baby. If a mild allergy to one of these medications develops, the other medication may be substituted. If there is a problem with taking pills or more severe drug allergy, then an operation may be performed to remove most of the thyroid gland. This is usually done in the middle part of the pregnancy. Fortunately, it is rarely necessary.

The natural course of hyperthyroidism in pregnancy is for the disease to become milder or remit totally near term. In many patients antithyroid medications can be tapered to low levels or even discontinued. For those patients who are not so fortunate, it is important to maintain control of the hyperthyroidism throughout pregnancy to avoid severe thyrotoxicosis (thyroid storm) developing during labour and delivery. If this does develop, additional acute treatment with beta-adrenergic blocking drugs such as propranolol (Inderal) and high doses of nonradioactive iodine are used. Long-term treatment with these agents is not advised in pregnancy, although some physicians use propranolol when the disease is first diagnosed to control symptoms until the antithyroid medications have had a chance to work.

FETAL THYROID DISEASE

Antithyroid medications, nonradioactive iodine and, very rarely, maternal thyroid antibodies can all cross the placenta and cause hypothyroidism in the baby. Nonradioactive iodine, which is present in some medications, including some cough medications, can cause a goiter in the fetus, making delivery difficult or causing respiratory obstruction. For this reason, iodine containing drugs should never be used in pregnancy except in the case of thyroid storm. Unfortunately, there is no simple blood test to assess the baby's thyroid function in the womb, although measurements of thyroid hormone or TSH levels in the amniotic fluid sac have been used in research studies. Plain X-rays sometimes show delayed bone development in fetal hypothyroidism, but this test is usually not recommended. Screening for hypothyroidism at birth, now done routinely in North America on all babies, identifies the need for early short- or long-term thyroxine treatment, with excellent long-term follow-up results.

Fetal thyrotoxicosis (hyperthyroidism) occurs occasionally due to transfer of maternal thyroid-stimulating antibodies across the placenta. Most often, the mother herself has hyperthyroidism which is being treated with antithyroid drugs that also passively treat the baby by crossing the placenta. Sometimes, however, the mother's thyrotoxicosis occurred in the past and was controlled by either radioactive iodine treatment or an operation in which the mother's thyroid gland was removed. In such a situation the mother has less thyroid tissue and cannot be hyperthyroid, even though she continues to have thyroid stimulating antibodies in her blood. Since the mother is well, fetal thyrotoxicosis may not be suspected. Clues to the presence of fetal hyperthyroidism are fetal heart rate consistently above the normal limit of 160 beats per minute and the presence of high levels of thyroid stimulating antibodies in the mother's blood.

All women with Graves' disease or a history of Graves' disease should be tested for thyroid-stimulating antibodies late in pregnancy. The consequences of untreated fetal thyrotoxicosis include low birth weight and head size, fetal distress in labour, and neonatal heart failure and respiratory distress. Administration of antithyroid drugs to the mother during pregnancy can treat the baby in this situation. Close follow-up and continued treatment is required after delivery.

POSTPARTUM THYROID DISEASE IN THE MOTHER

Pre-existing Thyroid Disease. For pre-existing hypothyroidism, thyroid hormone treatment is continued after delivery and breast feeding is encouraged. Thyroid hormones do not get into breast milk in significant amounts.

Graves' disease (hyperthyroidism due to a diffusely overactive thyroid) is prone to relapse or worsen in the postpartum period. If that happens, antithyroid drugs can be started or their dose increased, or radioactive iodine can be given if the mother is not breast feeding. Women taking PTU (propylthiouracil) may breast feed, since little of this drug crosses into the milk. Nursing is also possible for women who take methimazole, although more of the drug gets into breast milk. In both cases the baby's thyroid function should be monitored. Definitive therapy with radioactive iodine should be considered, although many breast-feeding women will wish to postpone this, since some of the mother's radioiodine crosses into her baby through the breast milk.

Postpartum Thyroiditis. Postpartum thyroiditis may occur in 8 to 10 percent of women. This disease also occurs in the nonpostpartum period, as well as in men, and is probably an autoimmune thyroid disease related to Hashimoto's thyroiditis. Typically, it consists of a temporary period of hyperthyroidism lasting from six weeks to three months postpartum, followed by hypothyroidism between three and nine months after delivery. Women at risk include those with a previous history of postpartum thyroiditis or those who can be shown to have thyroid antibodies in their blood but are not taking thyroxine. Usually, no treatment or only symptomatic treatment is required for the hyperthyroid phase, and a short course of thyroxine treatment for six to twelve months is sufficient for the hypothyroid phase. Some

women do not recover from the hypothyroid phase and, therefore, require long-term thyroid replacement therapy.

During the first three months after delivery, symptoms of fatigue, depression, and impairment of memory and concentration are common and often unrelated to a woman's thyroid hormone level. However, after this time, hypothyroid women have more of these symptoms and may feel better if their hypothyroidism is corrected by thyroid hormone treatment. (See **The Bridge**, Vol. 3, No. 3, Fall 1988.)

Not every women who has an emotional disorder after pregnancy will be found to have thyroid dysfunction as the cause of her problem. Thus in one recent clinical study, no increased incidence of thyroid dysfunction was found in a group of women with postpartum psychoses. Nevertheless, it is still reasonable to perform thyroid tests (including a TSH blood level) in those women who do experience emotional disorders following pregnancy.

SOLITARY THYROID NODULE IN PREGNANCY

A thyroid nodule (lump) is an isolated area of thyroid enlargement usually noticed by the patient or detected on a routine examination by her physician. most nodules are benign (harmless), but there is invariably some concern because of the remote possibility of thyroid cancer. Thyroid scans are contraindicated in pregnancy, and while an ultrasound examination of the thyroid is safe, this test does not usually help in excluding the possibility of cancer. The best test to perform is a fine-needle aspiration biopsy to determine whether the nodule is benign or malignant. If examination of the biopsy specimen suggests that a cancer is present, necessary surgery can be performed in the middle part of pregnancy. If a nodule is discovered later in pregnancy, investigation and treatment can probably be deferred until the postpartum period.

SUMMARY

In dealing with thyroid disease in pregnancy, the physician and patient should be aware of problems that occur before and after, as well as during the actual pregnancy. There should be equal concern for the welfare of both the mother and baby. Fortunately, most thyroid conditions can be recognized, problems can be anticipated, and effective treatment is available. The outcome is almost always a healthy one, for both the mother and her baby.

Approved for distribution by:

Thyroid Foundation of Canada
1040 Gardiners Road, Suite C
Kingston ON K7P 1R7

Tel:(613) 634-3425
Fax:(613) 634-3483