Case Report

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Fetal Goiter was Resolved with Decreasing Maternal Propylthiouracil Dose

Maternal Propiltiyourasil Dozunun Azaltılması ile Kaybolan Fetal Guatr

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Abstract

We report a case of fetal goiter diagnosed by detailed ultrasonography. A 33-year-old woman at twenty weeks of gestation was referred to our hospital for detailed ultrasonography. A fetal goiter was identified. She was receiving propylthiouracil (PTU) 100 mg daily for Graves' disease. Amniocentesis was performed and fetal thyroid function was evaluated as normal. Her recent thyroid function tests were normal, but anti-thyroid antibodies were positive. The dose of PTU was reduced to 50 mg. However, at twenty six weeks of gestation, maternal thyroid-related autoantibodies became undetectable. A fetal magnetic resonance imaging demonstrated a slight shrinkage of the fetal goiter at 30 weeks. The fetus was delivered vaginally. Thyroid function tests of the neonate were normal, and neonatal goiter was nonpalpable. Fetal goiter is a rare disease. It can be spontaneously resolved by decreasing the maternal dose of PTU.
Keywords: Fetal goitre, graves, propylthiouracil, thyrotoxicosis

Öz

Detaylı ultrason esnasında saptanan fetal guatr olgusunun literatür eşliğinde tartışılması. Anomali taraması için yirminci gebelik haftasında kliniğimize yönlendirilen 33 yaşındaki gebeye yapılan sonografide fetal guatr saptandı. Gebe Graves hastalığı için günlük 100 mg propiltiyourasil (PTU) almaktaydı. Gebenin tiroid fonksiyonları normaldi fakat tiroid otoantikorları pozitifti. Gebeye amniosentez yapıldı ve fetal tiroid fonksiyonları normal olarak saptandı. PTU dozu 50 mg'ye düşürüldü. Yirmi altıncı gebelik haftasında maternal kanda tiroid otoantikorları kayboldu. Otuzuncu gebelik haftasında gerçekleştirilen fetal manyetik rezonans görüntülemesinde fetal guatrın ihmal edilecek düzeyde küçüldüğü görüldü. Doğum sonrası fetüsün tiroid fonksiyonlarının normal olduğu ve guatrının kaybolduğu izlendi. Fetal guatr oldukça nadir bir hastalıktır. Annenin gebelikte kullandığı PTU dozunun düşürülmesiyle spontan olarak kaybolabilmektedir.
Anahtar kelimeler: Fetal guatr, graves, propiltiyourasil, tirotoksikozis

Introduction

Fetal goiter is an uncommon, serious problem during pregnancy. Careful routine antenatal ultrasound screening can find out an intrauterine fetal goiter. Fetal goiter has an incidence of 1:40000 live births (1). 80% of cases are caused by dysgenesis of the thyroid gland. The rest 5% and 15% are due to hypothalamo-hypophyseal abnormalities and dyshormonogenesis, respectively. 8% of cases are due to hyperthyroid pregnant on antithyroid medication (2). The anti-thyroid antibody types and the medication status of the patient may cause hyper, hypo or euthyroid fetuses.

Untreated intrauterine hypothyroidism may predispose to motor or cognitive deficits, or impaired intellectual development. A large mass on the anterior neck may lead to extension of fetal head and malpresentation (3). Our study reports a case of fetal goiter successfully treated with incrementally decreasing dose of maternal propylthiouracil (PTU).

Maternal thyroid hormone-stimulating antibodies can stimulate a fetal thyroid to result in a goitrous hyperthyroidism. Fetal tachycardia and subsequent fetal hydrops may develop after fetal hyperthyroidism. Elevated maternal anti-thyroid peroxidase (anti-TPO) and anti-thyroglobulin titers may give rise to suppression of thyroid hormone synthesis in the fetus. Furthermore, maternal antithyroid therapy may inhibit fetal thyroid peroxidase (2). Fetal hypothyroidism may lead to subsequent neurological impairment. The fetus may be hypothyroid, hyperthyroid or euthyroid when the fetal goiter is detected on the examination. Therefore, the evolution of fetal thyroid hormone levels is essential to decide whether to start early treatment (4). Especially when fetal goiter is diagnosed, serial amniocentesis should be done to check thyroid stimulating hormone (TSH) levels in the amniotic fluid reflecting fetal thyroid metabolism (5). Alternatively, cordocentesis, as the gold standard for the diagnosis, may be done for the assessment of the fetal thyroid hormone status (6).

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Case Report

A gravida 3, para 2, 33-year-old woman was referred to our clinic at 20 weeks of gestation for routine detailed ultrasonography. Her routine follow-up was performed until 20 weeks' gestation at the state hospital. The detailed ultrasonography revealed a symmetrical homogeneously thyroid gland measuring 1.67x1.45x2.15 cm (Figure 1, 2). Amniotic fluid index was 12 cm and fetal heart rate was normal. Other fetal organs and skeletal ossification appeared to be normal. Vaginal delivery was performed at 38 weeks of gestation.

She was receiving PTU 100 mg/dL for hyperthyroidism due to Graves' disease. The diagnosis of Graves' disease was made 2 months before she was referred to our institution. Her recent serum thyroid function tests (TFT) were: TSH-2.82 µU/mL (0.34-4.42), free triiodothyronine-3.62 pg/mL (2.5-3.9), free thyroxin-0.81 ng/dL (0.61-1-12), anti-TPO-41 IU/mL (0-35), and thyroid-stimulating immunoglobulin-19 U/L (9-14). Amniocentesis was performed at 20 weeks of gestation. Amniotic fluid TSH level was normal (0.173 mU/L, range: 0.15-0.55). The PTU dose was reduced to 50 mg. Maternal TFT was normal, and thyroid-related autoantibodies were not detectable at 26 weeks of gestation. Ultrasonographic evaluation of the fetal goiter showed a progressive decrease in size at 27 weeks of gestation. As shown in Figure 3, fetal magnetic resonance imaging demonstrated a slight shrinkage of the goiter at 30 weeks and 1 day of gestation.

At 38 weeks, a healthy male infant weighted 3.250 g was delivered vaginally. There was neither a sign of a palpable goiter nor a problem with the neonate's airway. TFT of the neonate conducted thereafter were normal, and no palpable goiter has recurred until 6 months of age.

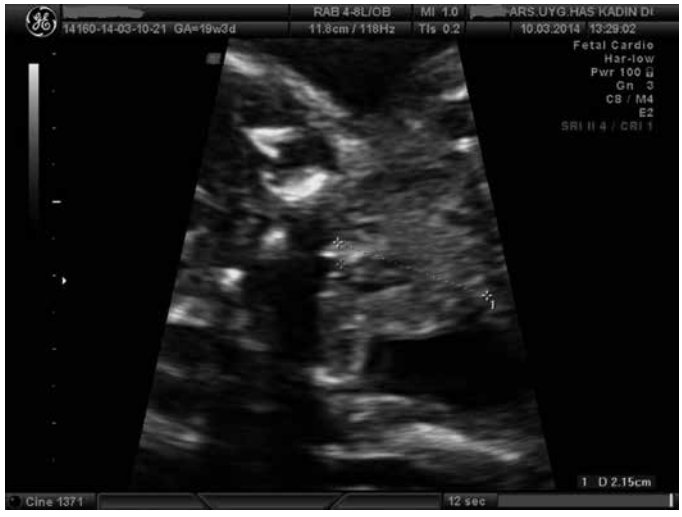

Figure 1. Homogeneously, symmetric, bilobular fetal goiter viewed at the 20th week of gestation

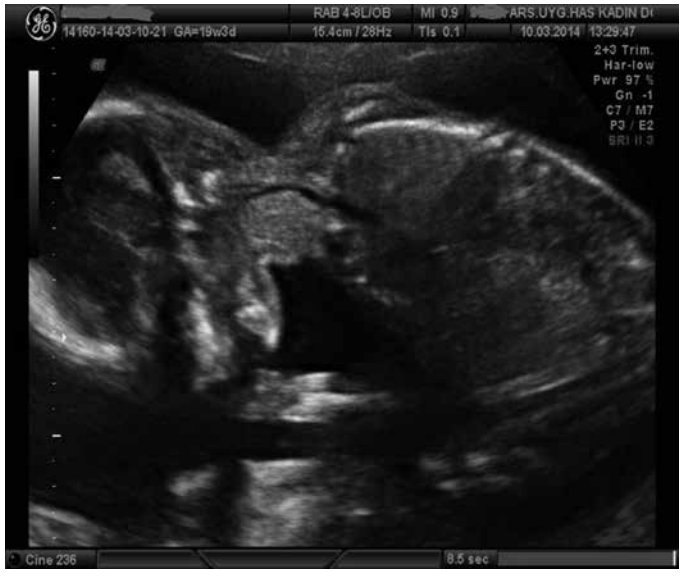

Figure 2. Enlarged thyroid gland (1.67x1.45x2.15 cm) images at sagittal plane

Discussion

Graves' disease is seen in about 0.2% of pregnant women. Pregnant women with Graves' disease are generally treated with an antithyroid drug such as PTU, however, since PTU can pass through the placenta, large doses of PTU can affect the fetus, causing hypothyroidism and goiter (7).

Fetal goiter secondary to maternal PTU use can be resolved with incrementally decreasing the dose of PTU or fetal intraamniotic therapy with T4 or T3 (8). PTU can suppress fetal thyroid production. This effect is dramatic after the first trimester. Rosenfeld et al. (2) have reported two pregnant women treated with PTU during pregnancy. They found that both infants, who had fetal hypothyroidism accompanied by goiter, eventually developed neonatal hyperthyroidism.

Polak et al. (9) have interpreted thyroid functions by the way of ultrasonographic characteristics of the fetus. They have concluded that fetal tachycardia, accelerated bone maturation and increased

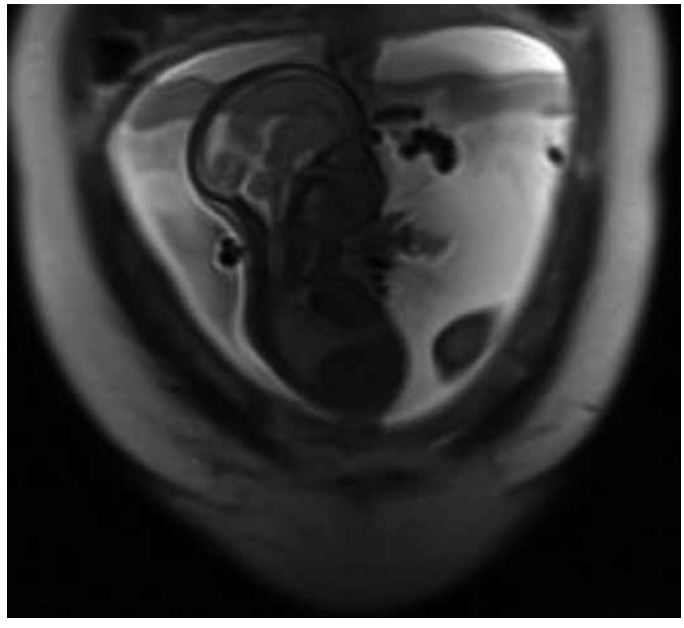

Figure 3. Fetal magnetic resonance imaging demonstrated slight shrinkage of the goiter after the treatment

thyroid vascularization on thyroid Doppler ultrasound might indicate fetal hyperthyroidism while, delayed bone maturation and fetal bradycardia might be an evidence of fetal hypothyroidism.

When fetal hypothyroidism is diagnosed on the basis of amniocentesis or cordocentesis, intra amniotic L-thyroxin injections (150-500 µg/week) are administered (4). There is no consensus on the interval and dose of L-thyroxin treatment in the literature. High-dose thyroxin may result in intrauterine growth restriction, fetal tachycardia, fetal hydrops and intrauterine loss of the fetus. Hashimoto et al. (10) have recommended an initial dose of thyroxin 150 mg that gradually increased to avoid the adverse effects. Von Loon et al. (11) have recommended weekly injections of 250 mg of L-thyroxin.

There are few reports of fetal goiter resolving via decreasing PTU in the literature. Our case demonstrates that fetal goiter caused by maternal antithyroid therapy can be resolved via noninvasive management.

Ethics

Informed Consent: Consent form was filled out by all participants.
Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: And Yavuz, Design: And Yavuz, Mehmet Özgür Akkurt, Data Collection or Processing: And Yavuz, Burak Tatar, Analysis or Interpretation: And Yavuz, Mehmet Özgür Akkurt, Literature Search: Yakup Yalçın, Writing: And Yavuz, Burak Tatar, Gökhan Karakoç.
Conflict of Interest: No conflict of interest was declared by the authors.

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