Fetal hyperthyroidism associated with maternal thyroid autoantibodies: A case report

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A 33-year-old Caucasian woman was referred at 24 + 3 weeks of gestation due to fetal tachycardia and hydrops. She had an uncomplicated pregnancy 16 years previously and was on levothyroxine after total thyroidectomy for Graves’ disease 6 years previously, when she developed moderate exophthalmos. Laboratory evaluation revealed appropriate thyroid function for this time of gestation: thyroid stimulating hormone (TSH) 1.7 μU/ml (1–3), free T4 18.53 pmol/l (12–22), with positive antibodies: anti-TPO 157 U/ml (1–35), TSH receptor antibodies (TRAb) 171.95 U/l (<1.75). The diagnosis was fetal hyperthyroidism due to transplacental passage of stimulating maternal TRAb. Methimazole and digoxin were initiated. The patient remained euthyroid, with fT4 levels in the upper normal range. The fetus showed intrauterine growth retardation, oligohydramnios, aggravating hydrops, goiter with increased central vascularization and improved heart rate without signs of cardiac failure. At 30 + 3 weeks a hydropic fetal newborn (birthweight 1560 g) was delivered by cesarean section and admitted to the neonatal intensive care unit. Cord serum showed neonatal hyperthyroidism. Methimazole and propranolol were administered to the newborn. On the 5th postnatal day the infant died because of severe infection inducing respiratory dysfunction, hemodynamic deterioration and cardiac asystole. Graves’ disease occurs in about 0.2% of pregnancies. Hyperthyroidism occurs in 1–5% of neonates born to mothers with Graves’ disease and the risk correlates with the maternal TRAb titer. Early diagnosis and treatment are crucial not only in pregnant women with active disease, but also in mothers with a history of Graves’ disease, even after definitive treatment such as thyroidectomy or ablative therapy.

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1. Introduction

Maternal hyperthyroidism occurs in about 0.2% of pregnancies and in most cases the cause is Graves’ disease. Graves’ disease is an autoimmune disorder due to stimulation of TSH receptor antibodies (TRAb). Fetal hyperthyroidism occurs in 1–5% of pregnant mothers with Graves’ disease, when maternal TRAb cross the placenta and stimulate the thyroid gland, leading to excessive thyroid hormone secretion. The risk correlates with the TRAb titer [1,2]. We describe a case of fetal hyperthyroidism in a pregnant woman who had previously had a thyroidectomy for her Graves’ disease.

2. Case presentation

A 33-year-old Caucasian woman was referred at 24 + 3 weeks of gestation due to fetal tachycardia and hydrops. She had an uncomplicated pregnancy 16 years previously and was on levothyroxine after total thyroidectomy for Graves’ disease 6 years previously, when she had developed moderate exophthalmos. Her medical history was otherwise uneventful.

On admission, a fetal ultrasound revealed fetal supraventricular tachycardia (SVT) (200 b.p.m), no structural heart abnormalities, facial skin edema (Fig. 1), mild pleural, pericardial and ascetic effusions (Fig. 2) and oligohydramnios. Laboratory evaluation revealed appropriate thyroid function for this time of gestation: TSH 1.7 μU/ml (normal range 1–3), free T4 18.53 pmol/l (12–22). However, tests were positive for auto-antibodies: anti-TPO 157 U/ml (<35), TSH receptor antibodies (TRAb) 171.95 U/l (<1.75).

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The diagnosis was fetal hyperthyroidism due to transplacental passage of stimulating maternal TRAb. Methimazole (20 mg/day) and digoxin (0.25 mg × 2/day) were initiated. Fetal blood sampling (FBS) performed at 25 + 4 weeks (seven days after methimazole initiation) showed a normal level FT4 16.09 pmol/l (normal mean ± SD 16.5 ± 5.3), a mildly suppressed TSH level 0.594 μU/ml (6.8 ± 2.93) and a high TRAb level 121.9 U/l (<1.75) [3]. Based on these findings, methimazole was reduced to avoid iatrogenic fetal hypothyroidism and propranolol (20 mg twice daily) was added.

The mother remained euthyroid, with FT4 levels in the upper normal range. A fetal ultrasound scan at 29 weeks) showed intrauterine growth retardation, oligohydramnios, aggravating hydrops, goiter with increased central vascularization of the thyroid gland (Fig. 3) and improved heart rate (148 bpm with episodes of SVT), without signs of cardiac failure [4]. A second FBS, at 29 + 1 weeks, that is, after 27 days of treatment, showed frank hyperthyroidism with high FT4 35.13 pmol/l (normal mean ± SD 16.5 ± 5.3), a mildly suppressed TSH level 0.594 μU/ml (6.8 ± 2.93) and a high TRAb level 121.9 U/l (<1.75) [3]. Based on these findings, methimazole was reduced to avoid iatrogenic fetal hyperthyroidism and propranolol (20 mg twice daily) was added.

Fig. 1. Facial skin edema of the fetus. Arrow indicates fluid under the fetal skin.

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Patient consent

Obtained.

Provenance and peer review

This case report was peer reviewed.

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Fig. 3. Enlargement of the fetal thyroid gland (solid arrow) with increased central vascularization on the color Doppler.