Helping Shelley: Thyroid Disease in Pregnancy

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Meet Shelley

- Shelley, 25, is two months pregnant. She presents with:
  - a 4.5 kg weight loss,
  - irritability,
  - tremulousness,
  - palpitations and
  - heat intolerance of a five month duration
- Three family members have had thyroid disease
- Shelley's physical exam reveals that she:
  - is jittery and fidgety,
  - has a resting pulse of 120 bpm,
  - has a fine tremor of the hands,
  - has a goiter,
  - her FT4 is 50 (N < 23),
    her FT3 index is 4.0 (N < 2.8) and
  - her thyroid stimulating hormone (TSH) is < 0.01

What is Shelley's diagnosis? Read on...

Thyroiditis is unusual during pregnancy and does not usually enter the differential diagnosis.

What's wrong with Shelley?

Based on the differential diagnosis, Shelley has Grave's thyrotoxicosis and gestational hyperthyroidism.

An individual suffering from Grave's thyrotoxicosis would present with the following:

1. Onset occurs pre-pregnancy
2. Little or no nausea and vomiting
3. Symptoms of hyperthyroidism that dominate the clinical picture
4. Thyroid antibodies that are often strongly positive
5. FT3 and FT4 that is usually markedly elevated
6. Treatment is almost always needed

An individual suffering from gestational hyperthyroidism would present with the following:

1. Onset occurs during the first trimester
2. Nausea and vomiting dominate the picture
3. Other symptoms of hyperthyroidism are mild or absent
4. Thyroid antibodies are usually negative
5. FT3 and FT4 usually minimally elevated
6. The etiology is thought to be thyroid stimulation, by excess human chorionic gonadotropin hormone
7. Treatment is not usually needed, as the condition resolves spontaneously

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Based off of the differential diagnosis, Shelley likely has Grave's thyrotoxicosis. An I131 uptake and scan clearly should not be done because of the risks to the fetus. Untreated Grave's thyrotoxicosis increases the maternal risks for:

- pregnancy-induced hypertension,
- eclampsia,
- heart failure and
- preterm delivery with fetal death.

The fetus would be at risk for:

- retarded intrauterine growth and
- low birth weight.

What are Shelley's treatment options?

Treatment options include anti-thyroid drugs and thyroidectomy. Fortunately, nearly all patients are easily treated with low doses of propylthiouracil (PTU) (initial dose 150 mg/day) or methimazole (MMI) (initial dose of 10 mg/day). Both FT3 and FT4 should be monitored, aiming for a FT4 in the upper range of normal. The thyroid-stimulating hormone reacts much too slowly to be helpful in this setting. The required dose usually decreases during the second and third trimesters. The newborn may suffer from transient hypothyroidism and should be assessed by a pediatrician at birth. Provided that the dose of PTU is < 200 mg (MMI < 10 mg), the mother may breast-feed safely.

About 70% to 80% of patients need 50% more L-thyroxine during pregnancy. The simplest approach is to increase the L-thyroxine dose by 30% as soon as you know the patient is pregnant.

Shelley's followup

- Two years later, Shelley presents six weeks pregnant
- In the interval, she has had ablative I131 therapy for recurrent thyrotoxicosis and is now on L-thyroxine 100 µg q.d.
- She feels well and has no complaints
- Her TSH is 2.0

Reasons for immediate transfer to a tertiary care centre include:

- a thyroid storm with fever,
- an altered mental status,
- seizures,
- nausea,
- diarrhea and
- cardiac arrhythmias.

Immediate treatment prior to transfer should include a dose of propranolol (80 mg to 120 mg, p.o.) a dose of PTU (300 mg, p.o.) and hydrocortisone (250 mg, intravenously)

TSH does not cross the placental barrier (PB). FT3 and FT4 do cross the barrier sufficiently to keep the fetus euthyroid if the mother is euthyroid. Thyreotropin-releasing hormone, Iodine and thyroid stimulating antibodies (TSIabs) cross the the PB easily. The anti-thyroid drugs PTU and MMI cross the PB, but in very small amounts.

About 70% to 80% of patients need 50% more levothyroxine (L-thyroxine) during pregnancy.[1] The simplest approach is to increase the L-thyroxine dose by 30% as soon as you know the patient is pregnant. Then make further

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adjustments by following the TSH and the FT4. Remember that the TSH reacts too slowly to be helpful over < six weeks. Usually, the required dose of L-thyroxin will decline slowly post-partum to the baseline in the first few months.

Take-home message

1. Hyperemesis gravidarum—lots of n&v and minimal thyrotoxic symptoms—is usually associated with gestational hyperthyroidism and does not need treatment
2. Grave's thyrotoxicosis—little n&v and lots of thyrotoxic signs—must be treated with propylthiouracil or methimazole
3. Follow treatment with FT3 and FT4 levels
4. Assess newborn for hypothyroidism
5. Increase levothyroxine by 30% as soon as pregnancy is diagnosed
6. Follow treatment with both FT4 and TSH
7. If initial maternal thyroid stimulating antibodies levels are high, consult a pediatrician early.[2]

TSIab should be done as soon as pregnancy is diagnosed. The higher the TSIab level, the greater the risk of fetal and neonatal hyperthyroidism. When the level is high, consult a pediatrician early.[2]

Well controlled hypothyroidism poses no additional risks to the pregnant mother, or to the fetus. Untreated hypothyroidism increases the risk for:

- spontaneous abortions,
- preterm deliveries,
- placenta abruption,
- preeclampsia for the mother
- low birth weight and
- retarded psychomotor development for the baby.

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References
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1. Best concise reference - Ross Douglas S: Overview of thyroid disease in pregnancy. UPTODATE ONLINE. www.uptodate.com. (Accessed June 2006).