Case 1: 24 yo pregnant female presenting with abnormal TFTs and tachycardia
The ER calls about a 24 year old, 12 weeks pregnant. She presented with tachycardia into the 190s.

En route with EMS, heart rate was 190s. She received adenosine 6 mg and 12 mg IV without improvement.

Endocrinology called due to TSH of 0.01
HPI

- The patient had actually been discharged from Jackson Park earlier in the day after 6 day stay for hyperemesis.
- She had a PICC line placed 4 days PTA for which she was receiving TPN. She tolerated PO for 2 days but was discharged with the PICC line in place anyway.
- Palpitations and chest pain began shortly after discharge
HPI Extended

- She states that, at Jackson Park, her thyroid was mentioned but no specifics were given.
- She did not think she received any medications for her thyroid.
- No personal history of thyroid disease.
- Weight loss in the setting of hyperemesis.
- No heat intolerance, no tremors, no diarrhea.
Extended History

**PMH:** gall stone pancreatitis in 2012 (also during pregnancy)

**PSH:** History of ERCP/biliary stent in 2012, C-section in the past

**Allergies:** None

**Meds:** Prenatal vitamin

**Social History:** Former smoker.

**Family history:** Aunt may have had thyroid disease but she is not sure.
Physical Exam

**Vitals:** 36.6, HR 106-166, BP 81-156/50-126, RR 16, SpO2 100%, BMI 26.9

**Gen:** No acute distress

**HEENT:** EOMI, no increased insertions, no proptosis/exophthalmos

**Neck:** thyroid gland normal in size, no nodules, no thyroid bruit

**CV:** regular rhythm, tachycardic, no murmurs

**Abd:** Soft, non-tender

**MSK:** Moving all extremities, no edema

**Neuro:** sensation intact to touch

**Skin:** warm, dry

**Psych:** normal mood and affect
Labs

TSH 0.01
FT4 1.26 (0.9 – 1.7)
T4  12.7 (RR 5.0-11.6)
Total T3 205 (80-195)

What else do you want?

What is your differential?
Differential Diagnosis?

- Graves’ disease
- Gestational transient thyrotoxicosis (sometimes referred to as Transient hyperthyroidism of hyperemesis gravidarum)
- Trophoblastic disease
- Hyperfunctioning nodule(s)
- ?Nonthyroidal illness
The thyroid in pregnancy

- Hypothalamus
  - TRH
  - Maternal pituitary
    - TSH
    - Maternal thyroid
      - Free $T_4$
      - Bound $T_4$
      - Total $T_4$
    - Placenta
      - Estrogen
      - TBG
      - hCG
  - Cross-reactivity of hCG with TSH

The University of Chicago Medicine
Free T4 in Pregnancy

- Measurement of FT4 by automated immunoassays results in a significant and assay dependent reduction in the measured FT4 in the 3rd trimester, even though this is not seen with more precise methods (dialysis, mass spectrometry).
- Automated assays influenced by pregnancy associated changes in serum proteins.
FT4 by IA vs. MS vs. ED

Involved 98 healthy pregnant patients

What exactly is the reference range for T4 in pregnancy?

2017 Guidelines of the American Thyroid Association for the Diagnosis and Management of Thyroid Disease during Pregnancy and the Postpartum

- After 16 weeks of pregnancy, can increase the non-pregnant upper reference limit by 50%
- Before week 7, non-pregnant range should be used
- Between weeks 7-16, the upper reference limit can be calculated by increasing the non-pregnant reference by 5% per week
  - E.g. at 11 weeks of gestation (4 weeks beyond week 7), the upper reference range for T4 is increased by 20% (4 weeks x 5%)
What is the workup for suppressed TSH in the first trimester of pregnancy?
Reference Data

- Not uncommon!

### Table 1

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<th>1st trimester</th>
<th>N</th>
<th>5th</th>
<th>25th</th>
<th>50th</th>
<th>75th</th>
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<td>1.14</td>
<td>1.94</td>
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</table>

Gestational transient thyrotoxicosis

- Related to direct stimulation of the thyroid by bHCG
- Associated with hyperemesis gravidarum (5% weight loss, severe nausea/vomiting, ketonuria)
- 1-3% of pregnancies
Patient course

- IUP was confirmed by OB
- Patient was given IVF, metoprolol, and electrolyte replacement
- HR remained in the 140s, patient continued to have symptoms

Now what???
Would you consider antithyroid drugs?
IUP was confirmed by OB
Patient was given IVF, metoprolol, and electrolyte replacement
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Now what???
Would you consider antithyroid drugs?
Patient course

- IUP was confirmed by OB
- Patient was given IVF, metoprolol, and electrolyte replacement
- HR came down to 100-110, patient’s symptoms resolved
- Patient found to have a DVT in arm with the PICC line and was started on Lovenox. CT PE negative.
Workup and management?

• Because patient was feeling better, no antithyroid drug
• Sent TSI, Ab to TPO/Tg, Reverse T3

2017 ATA Guidelines

The appropriate management of abnormal maternal thyroid tests attributable to gestational transient thyrotoxicosis and/or hyperemesis gravidarum includes supportive therapy, management of dehydration, and hospitalization if needed. Antithyroid drugs are not recommended, though beta-blockers may be considered. *(Strong recommendation, Moderate quality evidence)*
Workup and management?

- Because patient was feeling better, no antithyroid therapy
- Sent TSI, Ab to TPO/Tg, Reverse T3

Endo Society Guidelines

3.2. Most women with hyperemesis gravidarum, clinical hyperthyroidism, suppressed TSH, and elevated free T₄ do not require ATD treatment. USPSTF recommendation level: A; evidence, good (1‖⊕⊕⊕⊕). Clinical judgment should be followed in women who appear significantly thyrotoxic or who have in addition serum total T₃ values above the reference range for pregnancy. Beta blockers such as metoprolol may be helpful and may be used with obstetrical agreement. USPSTF recommendation level: B; evidence, poor (2‖⊕⊕⊕⊕).
Course of gestational transient thyrotoxicosis

Fig. 2. Percentage of TSH <0.1 mIU/L by gestation.

Patient Course

- Patient discharged with Maternal Fetal Medicine follow up given her tachycardia, anemia
- We chose not to use a beta blocker
- All antibodies returned normal
- Reverse T3 480 (RR 119-330)
- At MFM follow up, she reports feeling well other than arm pain.
- TFTs to be re-checked next visit (~week 18)
2017 Guidelines of the American Thyroid Association for the Diagnosis and Management of Thyroid Disease during Pregnancy and the Postpartum
Kurita et al. Measurement of thyroid blood flow area is useful for diagnosing the cause of thyrotoxicosis. Thyroid 2005.
Bahn et al. The role of propylthiouracil in the management of Graves’ disease in adults: report of a meeting jointly sponsored by the American Thyroid Association and the Food and Drug administration. Thyroid 2009.