Diagnosis and Treatment of Hypothyroidism in Pregnancy

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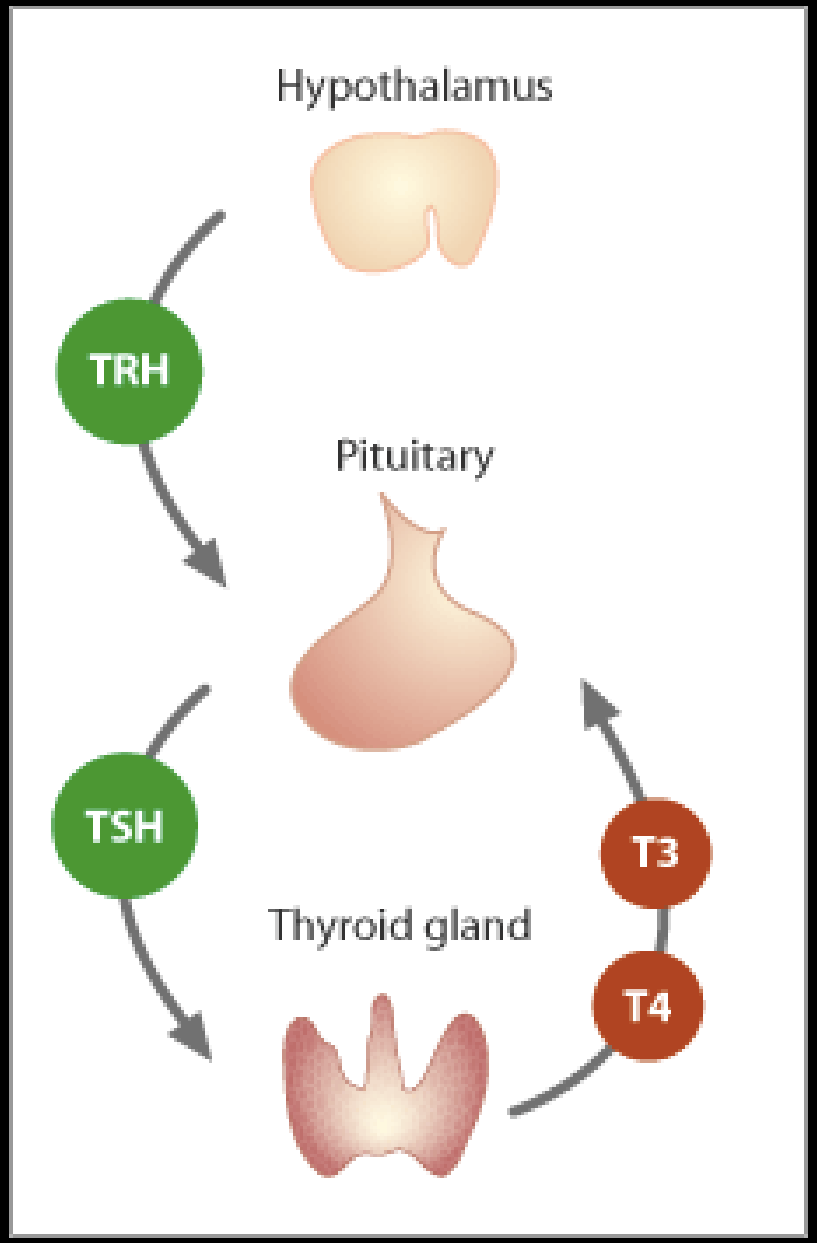
Goals

- Review thyroid physiology in pregnancy
- Discuss diagnosis of hypothyroidism
- Outline treatment of hypothyroid disease in pregnancy


Hypothalamus
TRH
Pituitary
TSH
T3
Thyroid gland
T4

Thyroid Changes During Pregnancy

- Increased serum thyroxine-binding globulin (TBG) by two-fold due to estrogen
  - Increased T4 and T3
  - Free T4 remains stable
- Stimulation of thyrotropin (TSH) receptors by hCG (peaks at 10-12 weeks)
  - TSH is reduced – undetectable in 10-20% of normal women
  - Transient mild increase free T4
- Maternal thyroid volume 30% larger by 3rd trimester

Hypothyroidism

- 2-10/1,000 pregnancies
- Primary hypothyroidism: inadequate thyroid hormone (T4 and T3) production by thyroid gland
- Secondary hypothyroidism: inadequate pituitary production of TSH
- Tertiary hypothyroidism: inadequate hypothalamic production of TRH
- Iodine necessary to make thyroid hormone

Maternal Status	TSH	Free T4
Overt hypothyroidism	Increase	Decrease
Subclinical hypothyroidism	Increase	No Change
Pregnancy	Varies by trimester	No change

Symptoms of Hypothyroidism

- Fatigue
- Cold intolerance
- Constipation
- Weight gain
- Dry skin
- Coarse hair, hair loss, brittle nails
- Nonpitting edema
- Anemia

Fetal Thyroid Function

- Initially reliant on maternal production
- Fetal thyrotropin (TSH) detected at 10-12 weeks
- Hormone synthesis at 18-20 weeks, increases to term
- TRH, T4, and anti-thyroid antibodies can cross placenta
- TSH minimally crosses the placenta

Risks of Thyroid Disease in Pregnancy

- Preeclampsia and gestational HTN
- Placental abruption
- Nonreassuring fetal heart rate tracing
- Preterm delivery
- Cesarean
- Neuropsychologic and cognitive impairment
- Postpartum hemorrhage

Laboratory Findings in Hypothyroidism

- Check TSH and free T4
- Trimester specific TSH upper limits:
  - First trimester: 2.5 mU/L
  - Second and third trimesters: 3.0 mU/mL
- Free T4 (thyroxine) decreased in overt hypothyroidism
- Central hypothyroidism has normal to low TSH

Subclinical hypothyroidism

- 2% of screened women in U.S.
- Elevated TSH with normal free T4
- Increased risk of miscarriage, possibly impaired cognitive development
- Treatment does not improve obstetric outcomes
- Recent MFMU RCT found treatment did not impact 5 year neurodevelopmental outcomes

Who to screen?

- Selective screening may miss 1/3 of women with overt or subclinical hypothyroidism
- Universal screening does not improve outcomes compared to targeted
  - No difference in adverse pregnancy outcomes
  - No difference in child neurocognitive outcomes

Who to Screen?

American Thyroid Association (ATA),

Endocrine Society, and American College of Obstetricians and Gynecologists recommend:

Targeted case-finding

Who to Screen?

- ATA and Endocrine Society: symptomatic, from area of iodine deficiency, personal or family history, TPO antibodies, Type 1 DM, h/o PTD, h/o miscarriage, h/o head or neck radiation, BMI>40, infertility, age >30 years
- ACOG: personal history, symptomatic

No, really, who?

- Family or personal history
- Symptoms
- Autoimmune disease
- Head and neck radiation
- *Recurrent miscarriage*
- *Morbid obesity*

Treatment

- Synthetic thyroxine: pick one and stay constant (levothyroxine)
  - If TSH 10 or greater: 1.6mcg/kg/day
  - If TSH <10: 1 mcg/kg/day
- Take on an empty stomach, an hour before breakfast
- Do not take with iron formulations
- PPIs can impede absorption

Treatment

- If already on maintenance synthetic thyroxine prepregnancy, anticipate dose increase of 30-50%
  - Either increase dose by 30% immediately
  - OR immediately measure TSH when pregnancy established

Monitoring

- Recheck TSH four weeks after initiating therapy
- Check four weeks after each dose change
- Check once each trimester
- Goal is TSH in trimester-specific range:
  - 1st: 0.1 to 2.5 mU/L
  - 2nd: 0.2 to 3 mU/L
  - 3rd: 0.3 to 3 mU/L

Postpartum

- Consider maintaining dose vs dropping to prepregnancy dose
- Overt hypothyroidism may interfere with lactation → if nursing may be better to maintain dose, recheck after establishment of milk production
- Recheck TSH at postpartum visit

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