

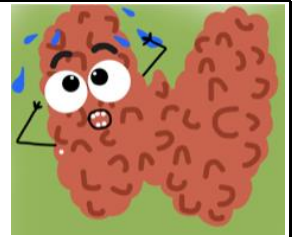


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# Hyperthyroidism

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## 1. Definitions:

- Thyrotoxicosis: excess thyroid hormone from *any source*
- Hyperthyroidism: excess thyroid hormone produced *by thyroid tissue*
- Thyroid storm: severe form of hyperthyroidism. Often triggered by surgery, trauma, infection, pregnancy, meds. Clinical Dx: tachycardia, hyperthermia, AMS, GI symptoms. [Wartofsky score](#).

## 2. History: Body in metabolic overdrive: anxiety, increased bowel movements, palpitations, hyperthermia, sweating, unintentional weight loss, emotional lability, insomnia, irregular periods.

## 3. DDx of thyrotoxicosis

- Primary hyperthyroidism: Grave's disease > autonomous thyroid nodule(s), thyroiditis (can be painful, temporary T3/T4 increase due to release of pre-formed hormone)
- Secondary hyperthyroidism: very rare, due to pituitary overproduction of TSH
- Ingestion of thyroid hormone
- Iodine load: iatrogenic; amiodarone (though amio more commonly causes hypothyroidism)
- *Clinical pearl*: biotin supplementation can lead to falsely low TSH and high T4, mimicking hyperthyroidism. Hold biotin for 48 hours and re-check labs!

## 4. Physical Exam:

- Thyroid exam:
  - Sometimes can appreciate an enlarged thyroid via observation while swallowing
  - Palpation: evaluate size, the presence/absence of nodules, tenderness to palpation
- HEENT: proptosis, lid lag (seen in Graves' disease)
- CV: tachycardia
- Extremities: fine tremor, proximal muscle weakness, hyperreflexia
- Skin: warm, moist

## 5. Evaluation:

- Initial testing:
  - TSH: would expect to be low in the setting of primary hyperthyroidism
  - Free T4: would expect to be high. *Can be normal in a subset of patients*
  - Total T3: would expect to be high (Note: free T3 is just not a very reliable lab test)
- If suspicious of Graves' disease (most patients, especially if enlarged, non-tender thyroid):
  - Next step: Thyroid receptor Ab (e.g. TSI = thyroid stimulating immunoglobulin or TBII)
  - Radioactive iodine uptake test: would be high in Graves', not first line test
- Other testing based on clinical suspicion
  - Painful c/f thyroiditis: ESR & radioactive iodine uptake scan (would expect to be low)
  - Nodule: radioactive iodine uptake scan: can visualize a "hot" nodule
  - Suspicious of ingestion: thyroglobulin (would be low; endogenous tissue suppressed)

## 6. Management:

- Regardless of etiology, beta-blocker can help (exp: propranolol 60-80mg XR, atenolol 25-50mg)
- For Graves's disease
  - Anti-thyroid medications: methimazole (1<sup>st</sup> line) > PTU (1<sup>st</sup> trimester of pregnancy). ~30-50% of patients remit after ~1-1.5 years of therapy
  - Radioiodine ablation: leads to hypothyroidism, often requiring thyroid hormone supplementation. Contraindicated in pregnancy and those who are breast-feeding
  - In severe cases: thyroidectomy
- Thyroid storm: endocrine emergency, call endocrine consult, often requires ICU admission!
- Additional resources: [NEJM Resident 360](#) section on thyroid disorders